GOVERNMENT OF KARNATAKA

SCHEDULES

VOLUME: III

APPOINTMENT OF CONCESSIONAIRE ON TIPPING FEE BASIS TO EXECUTE THE COMPREHENSIVE INTEGRATED SOLID WASTE MANAGEMENT (ISWM) FACILITIES INCLUDING SECONDARY TRANSPORTATION OF MSW FROM TRANSFER STATIONS TO DESIGNATED PROCESSING CENTERS AND FURTHER PROCESSING AND DISPOSAL OF THE SAME

in South Package (RR Nagar Zone, Mahadevapura Zone, South Zone & Bommanahalli Zone) of BBMP and Bengaluru Urban District jurisdiction by seeking private sector participation on Public Private Partnership (PPP mode – DBFOT Model)

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SCHEDULE 1- SCOPE OF SERVICES
(See Article 2)

2.1 Name of the work

Appointment of Concessionaire on Tipping Fee basis to execute the Comprehensive Integrated Solid Waste Management facilities including Secondary Transportation of MSW from Transfer Stations to designated Processing Center(s) and further Processing and Disposal of the same.

South Package: comprises of the 4 Zones of BBMP – Rajarajeshwari Nagar Zone, Mahadevapura Zone, South Zone, and Bommanahalli Zone, along with neighboring areas of the Bangalore Urban District, as detailed in Annexure I of the RFP.

2.2 Introduction

An Integrated Solid Waste Management (ISWM) facility has been conceptualized to offer a comprehensive solution for the processing of solid waste generated in Bengaluru City, at various locations as per project requirements. The ISWM Project involves secondary transportation of municipal waste and further processing solid waste into new or recycled products through methods such as composting, bio-methanation, waste-to-energy from RDF, pelletization, or other proven technologies, in accordance with the standards outlined in the Background Documents, Solid Waste Management Rules 2016, NGT orders, SBM 2.0, and other applicable laws and amendments during the concession period.

The aim is to process all waste generated and generate revenue by applying circular economy principles, thereby reducing the burden on landfills. This shall be achieved through an integrated system of secondary transport, processing and disposal. The entire system shall comply with the Solid Waste Management Rules, 2016 and meet the KPIs outlined in Article 19 of the DCA.

The scope of the Project (the—Scope of the Project) shall mean and include, during the Concession Period, Design, Build, Finance, Operate and Transfer (DBFOT) of facilities and infrastructure for:

a. Transportation of MSW from the Transfer Stations
b. O&M and Maintenance of Transfer Stations
c. Design, Development, Operation, Maintenance, and Management of Integrated

Processing Facility for MSW

d. Design, Development, Operation, Maintenance, and Management of Sanitary Landfill for disposal of remnants and residual inert matters from processing of MSW

e. Generation of revenue from sale of reusables and recyclables (if any), sale of by-products or output from processing of MSW (like gas, electricity, etc.), and generation of financial benefits from carbon credits

1.2.1. **Secondary collection, segregation, and transportation of MSW**

The Concessionaire shall be responsible for the following tasks related to Secondary Transportation, starting from at least [90 (ninety)] days prior to COD, or within 90 (ninety) days from the date of handover of the Transfer Station(s) to the Concessioniare in that division.

a. **Transportation of MSW from the Transfer Stations:** The Authority/Authority's agencies will bring in MSW generated in the Project Area and the waste collected from the street sweeping activity to the Transfer Stations. The Concessionaire shall be required to transport the waste from the Transfer Stations, starting from the Date of Commercial Operation (considering Mobilization Period as per the Agreement) or from the handover of the Transfer Station, whichever is later till the expiry of the Concession Period. The same shall be done in an order to ensure the following:

   i. **Transport to Concessionaire's processing facilities:** Concessionaire shall be responsible to conduct Secondary Transportation from the transfer stations to their designated waste processing and disposal site(s) (Note: There are some divisions where Transfer Stations exist and are being operated by another agency contracted by the Authority, wherein the responsibility for Secondary Transport will be handed over to the Concessionaire at the expiry of the existing contracts. More details are given in Annexure 1 of the PIM.)

   ii. **Integration with existing plants for BSWML**: Concessionaire shall be responsible to conduct Secondary Trasport from the notified Transfer Stations to Existing plants where BBMP has existing commitments (Annexure 1 of the PIM for details regarding location, capacity and type of waste required, tagging with transfer stations, duration of commitment)

   iii. **Integration with Dry Waste Collection Centers (DWCCs):** Concessionaire shall be required to collect the dry waste from the DWCCs and perform Secondary Transport from the DWCCs to the designated waste processing and disposal site(s) after extraction of recyclable materials by ragpickers. Refer Annexure 1 of PIM for details regarding DWCCs in the package, location,

capacity, assets included, layout, manpower engaged, etc. These will continue to be operated by the ragpickers associations, as per current scenario.

b. **Operation & Maintenance and Management of Transfer Stations:** Some Transfer Stations in this package are currently operational and operated by agencies contracted by the Authority. Refer Annexure xx for details regarding the current operator, assets in place, layout, duration of existing contract and scope of work for each of them. These (and the responsibility for Secondary Transportation under these Transfer Stations) will be handed over to the Concessionaire after a period of 5-7 years, as soon as the current agreement expires. Until such time, the Concessionaire will not be responsible for operation of Transfer Station or to perform Secondary Transport in these respective areas.

Wherever a Transfer Station doesn't currently exist, Authority shall be responsible to construct and handover Transfer Stations to the Concessionaire at their own cost, including civil structures, machinery, containers, hookloaders, etc. The Authority plans to develop such Transfer Stations in this package within the next 1-2 years. Refer Annexure xx for details regarding location, capacity, details regarding assets and layout of the planned Transfer Stations. Until such time, the Secondary Transportation in that area shall be done by the Authority/contractors of the Authority engaged in Primary C&T. (All the Transfer Stations, existing and new, being handed over shall include hook-loaders and containers provided by the Authority.)

The Authority shall have no obligation to perform any additional capital expenditure towards the Transfer Stations of vehicles over the course of the Concession Period pertaining to the Project Area, and the same shall be in the scope of the Concessionaire.

1.2.2. Processing & Disposal of MSW as per SWM Rules

a. **Design, Development, Operation, Maintenance, and Management of Integrated Processing Facility**: It is proposed to develop new facilities for Processing & Treatment of MSW as per MSW Rules and other applicable regulations for MSW processing, resource recovery, treatment, and disposal (P&D) facilities. Concessionaire shall develop the Project Facilities using technology or technologies that it had proposed in its Bid to the RFP, adhering to Solid Waste Management Rules, 2016 and in accordance with terms of this Agreement. Concessionaire shall be responsible for Construction of the Integrated Processing Facility within 24 months from the Execution Date or handover of the site, whichever is later; and operating the same for 30 years post COD.

b. **Design, Development, Operation, Maintenance, and Management of Sanitary Landfill for disposal of remnants and residual inert matters from processing of**

MSW: It is proposed to develop new sanitary disposal landfill and a leachate treatment plant (LTP) for management of inerts to be landfilled after processing of MSW. Concessionaire shall be responsible to transport inert and post-processing inert materials from their own processing sites to the landfills. Concessionaire shall be responsible for Construction of the Sanitary Landfill and the Leachate Treatment Plant (as per discretion of the Concessionaire) within 24 months from the Execution Date or handover of the site, whichever is later; and operating the same for 30 years post COD. Furthermore, the Concessionaire shall be responsible for performing post-closure activities as per prevailing guidelines of Central Pollution Control Board, State Pollution Control Board, SWM Rules, etc. over the next 15 years to ensure proper closure of the landfill.

c. The **revenue or income from the sale of segregated useful materials**, including reusable and recyclable materials (if any), compost, soil conditioner, raw RDF, C&D waste, soil, power, electricity, or any other by-products, shall accrue to the Concessionaire. The Concessionaire shall also be responsible to take necessary action to accrue benefits from Carbon Credits, and subsequently share 50% of the benefits accrued from the Carbon Credits of the Project with the Authority.

1.2.3. **Bulk Waste management:**

a. The management of bulk waste shall not be included within the Concessionaire's scope. However, the Concessionaire shall be empaneled as an Authorized Waste Processor for bulk waste as per existing bylaws of the BBMP and BSWML and encouraged to collect, transport, and process bulk waste at the ISWM facility. The Concessionaire shall be allowed to charge a Service Fee to BWGs, in line with the "Polluter Pays" principle of SWM Rules, 2016. The Concessionaire is to conduct their own analysis and survey of the bulk waste generated to ascertain the processing capacity of the plant(s) required.

b. Since this is a commercial activity conducted on government land, the Concessionaire shall remit INR 800 per TPD of bulk waste handled. This amount shall be escalated by 5% every year in line with the escalation in the tipping fee).

2.3 Planned Project Capacity

2.3.1. The comprehensive Integrated Solid Waste Management (ISWM) Project is intended to cover the entire jurisdictional area encompassing the full extent of BBMP limits and the Bengaluru Urban District area. This area is distributed across two packages, with the jurisdiction pertaining to South Package detailed more precisely and annexed as Annexure-I of the RFP.

2.3.2. Based on 2011 Census data, waste generation (excluding bulk waste) within the Project Area has been projected for 2030. While the facility is expected to commence operations around the year 2028, the waste generation estimates have been calculated for 2030 in

order to account for full operational capacity and long-term planning.

South Package: By 2030, the total municipal solid waste from households and street-sweeping activities—excluding bulk waste—is expected to be 4,113 tonnes of waste per day (TPD). Of this, 1,113 TPD is already committed to existing facilities for P&D. Once these commitments are accounted for, the Package shall have to deal with 3,900 TPD for Secondary Transportation and 2,999 TPD for Processing and Disposal.

2.3.3. The proposed planned capacity has been assessed and planned to meet the projected demand of Year 2030. Due to variations on a daily basis, the Concessionaire must accept maximum up to 125% of the Planned Capacity on any given day.

2.3.4. The Authority shall provide a Minimum Waste Guarantee, i..e, minimum amount of waste that shall be delivered to the Transfer Stations (excluding the amount committed to existing plants) equal to 50% of the Planned P&D Capacity in the first 5 years after COD, and equal to 70% of the Planned P&D Capacity thereafter. This shall include the waste from Bulk Waste Generators, if any, accepted for processing by the Concessionaire.

Planned Capacity	Secondary Transportation (TPD)	Processing & Disposal (TPD)
South Package	3,900	2,999

2.4 Detailed Scope of Work:

2.4.1. Scope of work for Secondary Transportation:

a. The average trip distance considered for secondary transportation—from the Transfer Station to the entry point of the processing plant up to the weighbridge—is estimated at 40.00 km for **South Package**. However, this distance may vary depending on the final locations of the Transfer Stations and the processing facility. In cases where the actual average trip distance varies by more than 10% from the estimated average, the additional lead distance for secondary transportation shall be considered for reimbursement, subject to the prior approval of the Authority. The final average trip distance shall be established based on the confirmed location of the weighbridge at the processing plant.

b. Secondary transportation shall be executed using large-sized static compactors capable of compressing municipal solid waste. Leachate generated during the compaction process shall be collected through designated leachate collection pits. The compacted waste shall be stored in containers provided by the static compactors and transported using hook loaders.

c. The Concessionaire shall submit a comprehensive plan and route map detailing the methodology for the secondary transportation of Municipal Solid Waste (MSW).

d. The jurisdictional area under the scope of **South Package** comprises 14 (fourteen) divisions. Each division shall be provided with a Transfer Station, to be developed by BSWML and subsequently handed over to the respective Concessionaire for that jurisdiction. a Project level, three (3) transfer stations are currently under AMC contracts with a tenure of seven years. Upon termination of these contracts and based on mutual consent between the Authority and the Concessionaire, these transfer stations shall be handed over on an as-is basis, along with the Secondary Transportation (C&T) scope under the corresponding ISWM package. Four (4) new transfer stations, currently under construction, shall be handed over to the Concessionaire along with the Secondary Transportation scope of the respective ISWM package. The additional transfer stations required under the respective package shall be developed by the Authority at its own cost and handed over to the Concessionaire in a phased manner, along with the corresponding Secondary Transportation responsibilities. The same shall be completed within the first 2 years from the Execution Date. Package-wise details of the Transfer Stations are provided in Annexure 1 of PIM.

e. The operation and maintenance of Transfer Stations handed over to the Concessionaire shall be the sole responsibility of the Concessionaire throughout the Concession Period.

f. MSW operations are essential in nature and should have a continuity without any

interrupt. The Concessionaire should work out a detailed plan with the Authority. The detailed transition plan shall be submitted by the Concessionaire within 90 days of appointment date and approved by the Authority and the same shall be implemented. While implementing the transition plan there should be a smooth and seamless handing over and taking over of the operations and public should not get any inconvenience of disruption of service.

g. The Concessionaire shall be responsible for identifying suitable land parcels and establishing the required infrastructure, including vehicle parking yards, workshops, canteens, and administrative buildings, in accordance with operational and regulatory requirements. These facilities are to be developed in each Zone at the Concessionaire's own cost and maintained in compliance with prevailing statutory and safety norms. The Concessionaire shall indemnify the Client against any liabilities arising from fire, health, or environmental hazards at these locations.

h. The commencement of Secondary Transportation activities shall be undertaken by the Concessionaire in a phased manner, subject to the completion or termination of contracts that may be active within each respective Zone.

i. The Concessionaire shall initiate the operation and maintenance of Transfer Stations, including storage, handling of waste, and transportation of Refuse-Derived Fuel (RDF) from designated Dry Waste Collection Centers (DWCCs) (as per Annexure 1 of PIM) to the Project facilities or to the existing commitment plants (as per Annexure 1 of PIM), immediately upon execution of the Concession Agreement. Delays in commencement of any activity under the agreed scope of work shall attract penalties in accordance with the Key Performance Indicators (KPIs) specified under Article 19 of the Concession Agreement.

Compliance

a. Each vehicle must display the designated route map and be integrated with the Integrated Command and Control Centre (ICCC) of the Authority via the Concessionaire's own software. The Concessionaire shall be responsible for completing all necessary activities, including obtaining statutory clearances related to land development, and mobilization/procurement of equipment, vehicles, machinery, and other resources essential for the transportation of MSW from the BBMP jurisdiction and Bengaluru Urban District areas, as specified for Package-1 in Annexure-1 of the RFP document.

b. The Concessionaire shall provide real-time data feeds and monitoring capabilities to BSWML to ensure continuous oversight of vehicle movements and operational transparency throughout the concession period.

c. A Vehicle Tracking and Management System (VTMS) shall be mandatorily installed on all vehicles, containers, and weighbridges used for MSW transportation and post-processing reject disposal. The VTMS shall be a web-based application

with real-time GPS tracking, GIS integration, and client-side connectivity at all key locations, including the weighbridge.

d. The Concessionaire shall supply all necessary hardware and infrastructure, including personal computers/laptops, printers, GPS devices, network links, SIM cards/dongles, and antivirus software. VTMS data shall be integrated with BSWML's municipal server via the IT Department, and training shall be provided to municipal and Authority staff. Vehicles shall be equipped with loading/unloading switches. Availability of VTMS data shall be a mandatory requirement for tipping fee disbursement.

e. All vehicles must be fully connected to the BSWML server through VTMS to enable uninterrupted tracking and monitoring. Each vehicle shall also be fitted with a GPS device that remains operational at all times, with the live feed integrated into BSWML's monitoring platform and website.

f. All vehicles deployed shall comply with prevailing emission norms, and valid Fitness Certificates (FCs) must be obtained from the RTO as per statutory requirements.

g. Noise and air pollution levels shall be monitored in line with norms prescribed by the RTO and Karnataka State Pollution Control Board (KSPCB). Relevant certificates shall be obtained periodically and prominently displayed on each vehicle.

2.4.2. Scope of work for Processing and Disposal:

a. The Estimated waste quantum of the package has been arrived as 2,999 for South Package towards Processing & Disposal which excludes bulk waste to be transported as well as discounts the Waste to be supplied to the existing commitments of corresponding package.

b. The Concessionaire shall prepare a comprehensive proposal for processing the total estimated waste, and undertake the design, development, operation, and maintenance of new integrated Solid Waste (SW) Processing, Resource Recovery, Treatment, and Disposal (P&D) facilities. The proposal shall incorporate appropriate technologies for processing the waste received at the plant. The technologies proposed must be in line with those approved under SWM Rules, 2016 (or any amendments thereof), or any other technologies approved by the CPCB, State PCB, or other relevant statutory bodies in India or abroad.

c. The Concessionaire shall undertake the planning, engineering, designing, construction, operation, and maintenance of MSW Processing, Resource Recovery, Treatment, and Disposal (P&D) facilities, including a scientifically engineered sanitary landfill, Leachate Treatment Plant (LTP), and all auxiliary infrastructure such as stormwater drainage, internal roads, weighbridges, vehicle parking yards, workshops, canteens, administration buildings, laboratories, and other appurtenant

structures as per operational and regulatory requirements.

d. The Concessionaire shall establish the required number of processing/ resource recovery projects, which may include waste-to-energy projects, bio-methanation, composting, compressed bio-gas (CBG) projects, MRF facilities, or any other suitable and sustainable technologies. These technologies must conform to SWM Rules, 2016 (or any amendments thereof), or be approved by the CPCB, State PCB, or other statutory bodies, and shall be implemented either at locations indicated by the Authority or at alternative sites approved by the Authority.

e. The Concessionaire shall install weighbridges at both the entry and exit points of the processing plant. Both weighbridges shall be synchronized with GPS and RFID mechanisms, at locations and configurations as deemed appropriate and mutually agreed upon with the Authority.

f. The Concessionaire shall also develop waste management facilities for the treatment and disposal of dead animals, sanitary waste, and any other waste types as authorized by the Authority as per the SWM Rules of 2016.

g. The successful Bidder is at liberty to choose the Proven and demonstrated technology in the beginning and during the course of the project. Any advanced technology which can improve the performance shall be permitted unconditionally. The technologies may be Compost / RDF / Waste to Energy / Bio Methanation / Dry Methanation / Pyrolysis / Plasma or any other technology which is proved and can be implemented to improve the processing and disposal is within the scope of the Concessionaire but should meet the SWM Rules, 2016 & SBM 2.0 guidelines.

h. Authority desires that its Solid Waste Management system shall be a 'model system' for the Country, which would scientifically collect waste from waste generator and bulk generators, transport, process and dispose of Municipal Solid Waste to have maximum recycling and recovery, Without prejudice to the generality of the foregoing, Concessionaire shall have the right to develop the Project Facilities using such technology that it considers suitable and commercially viable for the purposes of implementing the Project, in accordance with terms of this Agreement and Applicable Law. It is acknowledged that it is the intention of Concessionaire to use the technology associated with the concept of an integrated waste processing plant, the specifications of which are given in schedule 23, and that Concessionaire shall have the right to modify, adapt, upgrade or change the technology, from time to time, based on actual operations of the Plant and requirements of the Project.

i. The revenue or the income from the sale of the segregated useful material such as reusables and recyclables, compost, soil conditioner, user charges from bulk waste generators, raw RDF, C&D, Soil, sale of power, electricity or any other by-product materials shall be in the scope of the Concessionaire and Concessionaire shall take such additional revenue into account while estimating the tipping fee sought.

2.4.3. Items excluded from Scope of work

The following nature of scope is not considered as the part of Concessionaire's scope of work under this Agreement:

a. Receive, manage, process or dispose Bulk Waste Generated
b. Receive, manage, process or dispose Biomedical Waste Management
c. Receive, manage, process or dispose Industrial Waste Management
d. Sweeping of streets (Manual and/or Mechanical)
e. Drain cleaning / Silt clearing
f. Maintenance / cleaning of parks
g. Maintenance of public places / toilets
h. Removing and Transportation of carcasses (dead animals)
i. Management of Domestic Hazardous Waste: Hazardous waste such as physical, chemical, biological, reactive, toxic, flammable, explosive, or corrosive waste, if found, during excavation, sorting or segregation shall be stored in a separate area for inspection by authorities of the Municipal Corporation, which will arrange to shift, transport, and dispose by authority as per the Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016.

2.5 Role of Authority (BSWML):

a. The Authority shall initiate and implement appropriate processes to expedite land acquisition required for the development of the Integrated Solid Waste Management (ISWM) processing and disposal facilities.

b. The Authority shall ensure the smooth transition and handover of all relevant existing project facilities, including fixed and mobile assets related to municipal solid waste management. This shall include, but not be limited to Facilities for Secondary Transportation, as applicable.

c. The Authority will provide suitable, sufficient and encumbrance free land for construction of Integrated processing & disposal facilities and all other facilities required for the entire term of the agreement at permissive use only (Article-10.1). The details of the potentially available land parcels are annexed as part of the RFP.

d. The Authority shall permit the Concessionaire to utilize and obtain utilities necessary for the construction and operation of the project facilities, subject only to payment of applicable user charges, without levying any additional fees.

e. The Authority shall provide institutional support by issuing required letters or endorsements to concerned departments and facilitating the execution of necessary agreements between the Concessionaire and relevant agencies involved in the ISWM

project.

f. The Authority shall ensure timely payments of all dues payable to the Concessionaire under this Agreement, in accordance with the prescribed timelines.

g. The Authority shall recognize the Special Purpose Vehicle (SPV) as the legal entity authorized to undertake and perform the rights and obligations of the Selected Concessionaire under this Agreement. The Selected Bidder shall maintain a minimum of 51% (fifty-one percent) shareholding in the SPV throughout the Concession Period. Upon incorporation, the SPV shall be treated as a permitted assignee, and shall enter into a novation agreement with the Authority within 15 days from the date of incorporation.

h. The Authority shall have right over assets and technology in case of termination or expiration of Concession Period, whichever is earlier.

i. The Authority assures to Concessionaire that any of its officers, employees, or workmen shall not, at any time, during the concession period interfere with or obstruct the functioning, running, and overall management of the project and in any matter about or connected therewith.

j. The Authority shall appoint the Independent Engineer within 75 days from the date of signing of the Concession Agreement through a tender process to monitor the project execution and implementation.

k. The Authority will provide necessary support to Concessionaire in securing Applicable Approvals.

l. The Authority shall observe and comply with all its obligations as specified under this Concession Agreement.

2.6 Role of Concessionaire:

a. Design Build Finance Own & Transfer (DBFOT) on Public Private Partnership ("PPP") mode with 100% Concessionaire investment to execute the comprehensive Integrated Solid Waste Management (ISWM) facilities including collection & transportation of MSW from transfer stations to designated processing centers and further Processing and Disposal of the same at designated processing plant within the jurisdiction of the package.

b. To adopt the existing system (to the extent handed over by the Authority) and upgrade, modernize and make user-friendly over a period. To ensure revamping, redevelopment, operation and maintenance of all existing and new facilities including SCTPs, TS, MRFs, Fleets, Vehicle parking yards and workshops etc. To utilize the existing infrastructure like DWCC, vehicles, transfer stations, etc., 'as is where' is applicable.

c. To establish, operate and maintain all facilities for handling, processing and disposal of

MSW and other wastes as per proposal and in line with relevant Rules for the entire project period.

d. To design, engineer, finance, procure, construct, install, commission, operate and maintain each of the Project Facilities.

e. To choose proven and demonstrated technologies available for processing and disposal of MSW which are permitted as per SWM Rules, 2016, CPHEOO guidelines and SBM 2.0 Guidelines. The Concessionaire is free to choose technology, which is proven, viable and sustainable. To ensure adherence to meet all the construction requirements as per guidelines for construction as per BIS, Solid Waste Management Rules, 2016, and other applicable standards/ guidelines.

f. To undertake operation and maintenance of the project facilities using best in class technology, environmental, health and safety SOP's and a service delivery model either itself or through such Person as may be selected by it that is reliable, cost effective and compliant provided that and the ultimate obligation and responsibility for the performance of this agreement shall continue to vest with the Concessionaire.

g. To undertake storage, usage, marketing, and selling or disposal of all the products and by products generated, produced at the processing and treatment facility (including but not limited to RDF, steam, compost, electricity, methane, CNG/CBG, and Residual Inert Waste, any product or by product) and to generate revenue from the above processes to meet the project requirements

h. To retain all kinds of revenues generated from the sale of such recyclable products (RDF, Sync gas, Steam, compost, electricity, methane, CNG/CBG, and Residual Inert Waste) with no sharing to BBMP or Govt of Karnataka /India state Electricity Distributors companies and its entities.

i. To retain the fiscal incentives and benefits accruing in respect of or on account of the Project including Certified Emission Reductions (CERs) or Verified Emission Reductions (VERs) under Kyoto Protocol / Climate Change initiative, in a ratio of 50:50, wherein half the proceeds shall be shared with the Authority.

j. To undertake Information, Education, & Communication (IEC) campaigns with the public and all stakeholders in BBMP Area to inculcate good MSW management practices, including recycling, and segregation.

k. To interface, synchronize with existing organized and unorganized waste-collection and management systems to ensure that there is a smooth and harmonious transition and working of the systems and proper quality of waste is received at the site.

l. To exclusively hold, possess, and control the Site, in accordance with the terms of the

Concession Agreement for the purposes of the due implementation of this Project.

m. To transfer the Project Facilities to the Authority at the end of the Term or on Termination, in accordance with the provisions of this Agreement.

n. To ensure optimum utilization of the Site and land available and not use the same for any purpose unconnected or which is not incidental to the Project or related activities, unless otherwise permitted under this agreement. For avoidance of doubt, any land given by BSWML/BBMP to the Concessionaire for this project shall not be used for development of residential or commercial facilities or premises for rent, lease or similar purpose.

o. To mobilize resources for Secondary Transportation within the stipulated time period. Mobilization period for Secondary Transport shall within 03 months before the COD or 3 months from the date of handing over of the Transfer Station, whichever is later. Mobilization period includes time to obtain all the necessary clearances & approvals from relevant authorities and deploy the vehicles & manpower for secondary transportation. If the delay is beyond the control of the Concessionaire, then the mobilization period shall be extended based on the reasons recorded and in such recorded hindrances justified by the engineers in charge or the authorised representative of the Authority.

p. Special purpose vehicle('s) (SPV) shall be established under the Companies Act 2013 for executing the project, where the Concessionaire shall undertake and perform the obligations and exercise the rights of the Consortium/Selected Bidder under the LOA, including the obligation to enter into this Concession Agreement pursuant to the LOA for executing the Project.

SCHEDULE 2- APPLICABLE PERMITS

(See Article 4)

1. Concessionaire Applicable Permits

S. No.	Applicable Permit	Authority
1.	Temporary Power Connection (During Construction Period)	Electricity Board/ other temporary sources
2.	Consent to Operate	State Pollution Control Board
3.	Consent for storage of hazardous materials	Director of Explosives
4.	Consent Firefighting system	Firefighting Department
5.	CEIG approval – stage 1 for construction & stage 2 on completion of project	Chief Electrical Inspector to Government
6.	Electricity Board approval during various stages – request for load sanction, remittance of deposit, installation of incomings, etc	Electricity Board
7.	Layout and building plan approval	Authority/DTCP
8.	Consent to establish	State Pollution Control Board (SPCB)

The Concessionaire will be solely liable to obtain all Applicable Permits that are necessary for construction, operation and maintenance of the Project Facilities. The Authority shall assist the Concessionaire in obtaining all the required permits.

2. Authority Applicable Permits

S **No.**	Applicable Permit	Authority
1.	Tree cutting	Forest Department
2.	Road cutting & crossing	Public Works Department/RDPR
3.	Railway Crossing	Commissioner Railway safety
4.	Revenue road cutting & crossing	Panchayat/Local Authority

The Concessionaire shall proactively assist the Authority in obtaining all the required permits.

SCHEDULE 3 - SPECIFICATIONS AND STANDARDS

(See Article 5.1)

1. Project Facilities

1.1. The Project Facilities shall conform to the Specifications and Standards as specified in this Schedule and in this Agreement.

1.2. The Specifications and Standards applicable to the design and construction of the Project facilities (including Waste-to-Energy plant, Biomethanation plant, composting units, Sanitary Landfill site, Leachate Treatment Plant, etc. as may be applicable) shall conform with the National Building Code of India, relevant specifications and standards specified by the Bureau of Indian Standards (BIS), International Organization for Standardization (ISO), other Applicable Laws and Good Industry Practice.

The Concessionaire shall adhere to all applicable rules, regulations, acts, guidelines, standards and laws which are applicable for this Project. Some of these important rules, regulations, acts, guidelines, standards, etc. are as follows:

- All applicable rules, regulations, acts, guidelines, standards and laws of Government of India and the State Government
- All applicable Indian Standards (IS)
- All applicable standards by the Bureau of Indian Standards (BIS)
- All norms of the Indian Road Congress (IRC)
- All norms of the National Building Code (NBC)
- SWM Rules, 2016
- Environment (Protection) Act, 1986
- Environment (Protection) Rules, 1986
- EIA Notification, 2006 and amendments
- Guidelines and recommendation of Central Public Health & Environmental Engineering Organisation (CPHEEO), MoUD, GoI
- Electricity Rules, 2005
- Electricity Act, 2003
- Guidelines of the State Electricity Regulatory Commission
- All applicable norms of the Central Electricity Authority (CEA)
- All applicable rules, regulations, acts, guidelines, standards of Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB)
- Motor Vehicle Act and Vehicle Emission Control
- Labour Laws – Minimum Wages, Contract Labour Abolition and Regulations
- Construction standards by State Public Works Department and ULB and any other state government departments

1.3. ln the absence of any specific provision in this Agreement, the following standards shall apply in order of priority:

(i) [National Building Code
(ii) Bureau of Indian Standards (BIS)
(iii) International guidelines
(iv) Any other specifications/standards/codes proposed by the Concessionaire and reviewed by the Independent Engineer.]

SCHEDULE 4 - MAINTENANCE REQUIREMENTS

(See Article 5.1)

1. Maintenance Requirements

1) The Concessionaire shall comply with the O&M requirements set out in this Schedule and the Agreement Documents. In doing so, the Concessionaire shall ensure that the Project is operated and maintained to the standards and specifications as set out in the Construction Requirements and also meet the other requirements, if any, set out in the Agreement.
2) In the design, planning and implementation of all works and functions associated with the operation and maintenance of the Project, the Concessionaire shall take all such actions and do all such things (including without limitation, organising itself, adopting measures and standards, executing procedures including inspection procedures, and engaging contractors, if any, agents and employees) in such manner, as will:
    - Ensure the safety of personnel deployed on and users of the Project or part thereof;
    - Keep the equipment and machinery employed for the Project from undue deterioration and wear
    - Permit unimpaired performance of statutory duties and functions of any Party in relation to the Project;
3) During the Concession Period, the Concessionaire shall, in respect of the Project, ensure that:
    - Applicable and adequate safety measures are taken
    - Adverse effects on the environment and to the owners and occupiers of property and/or land in the vicinity of the Project components, due to any of its actions, is minimised
    - Any situation which has arisen or likely to arise on account of any accident or other emergency is responded to as quickly as possible and its adverse effects controlled/ minimised;
    - Disturbance or damage or destruction to property of third party by operations of the Project or Project components is controlled/minimised
    - Data relating to the operation and maintenance of the Project is collected
    - All materials used in the operation, maintenance of any of the Project component shall meet the Construction Requirements;
    - The personnel assigned by the Concessionaire have the requisite qualifications and experience and are given the training necessary to enable the Concessionaire meet the O&M Requirements.
4) The Concessionaire shall finalise the O&M Plan and the O&M Manual for the Project in the manner as set out below:
    - Prior to making application for the Readiness Certificate for the Project the Concessionaire shall finalise in consultation with the Independent Engineer:
        - The O&M Manual (including the formats for the reports to be submitted during the Operations Period and the Post Closure Period)
        - The O&M Plan for the first five years of operations and shall be modified for subsequent years
        - If applicable, the month-on-month maintenance schedule for each module of Waste to Energy plants for the first five years of the Concession Period.
    - Six weeks prior to the anniversary of COD each year, the Concessionaire shall submit to the Independent Engineer and The Authority an annual O&M Plan for the next year of operations.
5) Installation of Closed-Circuit Television Cameras
    - The Concessionaire shall install a closed-circuit television camera at Processing Facility Input and Output Weighbridges to record the vehicles being weighed. The camera shall

record clearly the registration details of the vehicle and face of the vehicle driver along with time. At the end of each day, a back-up copy of the closed-circuit television camera recording of the day shall be produced on compact disc (CD).

6) Weighing of Vehicles at the Processing Facility – All incoming and outgoing vehicles to the Processing Facility shall be weighed, inspected and cleaned regularly.
7) Maintenance of Structures
    - The CC, RCC, Masonry, Steel and other structures with the Processing Facility shall be reported to the Independent Engineer and shall be maintained in good conditions.
    - The CC, RCC, Masonry and other structures shall be checked for cracks and other deformations and shall be attended immediately
    - Periodic maintenance including plastering, cementing, painting, etc. shall be done for CC, RCC, Masonry and other structures periodically (at least once in two years)
    - Periodic maintenance including welding, riveting, painting, etc. shall be done for steel structures periodically (at least once in two years)
8) Maintenance of Utilities and Services
    - The utilities and services like water supply, wastewater collection and treatment, lighting, green belt, etc. within the Processing facility shall be attended immediately for any repairs and shall be maintained in good conditions.
9) Maintain Hygienic and Aesthetic Conditions
    - The MRF, Processing Facility shall be maintained hygienic and aesthetic conditions by taking proper measures as suggested by the Independent Engineer.
10) Hazardous Waste Disposal
    - [deleted]
11) Cleaning and Maintenance Requirements
    - The Concessionaire shall plan and execute cleaning and maintenance procedures ensuring, that:
        - The buildings, structures, seeded and planted areas, paved and unpaved traffic areas etc. are maintained clean and proper without damages, that may impede their functionality or appearance.
        - All moving or fixed equipment and machinery are maintained clean and in good working condition.
        - All service facilities, e.g. outdoor sewage system, leachate management system, etc., are inspected regularly, cleaned and maintained.
        - Every day at closing time the internal roads and other paved areas shall be inspected, and any spillage of MSW shall be collected and disposed properly.
12) Monitoring Procedures
    - The monitoring at integrated facility shall be carried out during implementation/ Construction Period, Operation Period and Post Closure Period. The monitoring plan shall be prepared in accordance to the applicable the State Pollution control Board requirements and as described in the Background Documents.
13) Management of Labour and Prevention of Accidents
    - The Concessionaire shall comply with all the provisions of the laws regarding deployment of labour under the contract; the Abolition of Contract Labour Act, the Minimum Wages Act, The Workmen's Compensation Act and the provisions of the MSW Rules 2016.
    - It shall be the liability and responsibility of the Concessionaire to implement the provisions of these acts. In addition to;
        - The Concessionaire shall not employ in connection with the work any person who has not completed 18 years of age.
        - The Concessionaire shall furnish to the Authority; information on the various

categories of labour employed by him and the facilities given to the employees in the form prescribed for the purpose at such intervals as may be specified in the work specification.

- The Concessionaire shall keep all records desired under the said labour laws and submit periodical returns to the respective statutory authorities.
- The Concessionaire shall in respect of labour employed by him comply with provisions of the various labour Laws and the Rules and Regulations as applicable to them in regards to matters provided therein and shall indemnify Authority in respect of all claims that may be raised against Authority for non-compliance thereof by the Concessionaire.

- The Concessionaire shall report and register all occurrences of;
  - Accidents involving risks for human health and security;
  - Other incidents connected with occupational health and security; and
  - Unscheduled interruptions to the planned operations including fires, explosions, break-down of vehicles, break-down of essential machinery & equipment, etc.
- The reports shall be forwarded to the Authority & relevant authorities. The registered information shall be kept in the "Report Book". The accident and other incident record formats and record keeping procedure shall be approved by the Authority.

14) Facilities and Benefits for the Work Force Employed
- The Concessionaire shall furnish the details of the work force employed for the work defined in this document – details of the workers including those for supervision before commencing the work.
- Each person (including Supervisor) deployed on this work shall be provided the following facilities.
  - Uniform with ID approved by the Authority (visible distinctly at night)
  - Safety and protective gears

15) Training, Social Programmes and Public Grievances
- Fortnightly/Monthly public awareness program details to be provided to the Authority by the Concessionaire one month prior to such program throughout the Concession Period
- The Concessionaire shall provide community and training center within the Project Site wherein multiple employments related capacity building and training activities shall be undertaken and necessary skills shall be imparted.
- The Concessionaire shall provide an employment opportunity based on training and skill assessment. The secondary employment and/or business opportunity shall be created through the facility operator or support services.
- The Concessionaire shall provide training and awareness to labourers at plant, which should be a continuous activity and maintain the records.
- The Concessionaire shall setup MSW management and innovation center for everyone which will be useful to locals, students and others who would wish to work in this field.
- The Concessionaire shall give prior importance to near by population to get involved in the activities of horticulture, garden maintenance, energy management, etc at the Project Facilities.
- The Concessionaire shall involve the NGOs, Govt. organizations, representative of local gram panchayats, Dist. Collector Officers, etc in consultation with the Authority for training and public awareness program.
- The Concessionaire shall maintain health records of all the artisans and labour staff. The health record formats and record keeping procedure shall be approved by Authority /concerned medical representative.
- The Concessionaire should create a system to register public grievances and redressal

system.

SCHEDULE 5 - SAFETY REQUIREMENTS

(See Article 5.1)

1. Guiding principles

1.1. Safety Requirements aim at reduction in injuries, loss of life and damage to property resulting from accidents on or about the Project, irrespective of the person(s) at fault.

1.2. Safety Requirements apply to all phases of construction, development, operation and maintenance with emphasis on identification of factors associated with accidents, consideration of the same, and implementation of appropriate remedial measures.

1.3. Safety Requirements include measures associated with safe movement, safety management, safety equipment, fire safety, enforcement and emergency response, with particular reference to the Safety Guidelines specified in Annex-l of this Schedule.

2. Obligations of the Concessionaire

The Concessionaire shall abide by the following:

(a) Applicable Laws and Applicable Permits;
(b) provisions of this Agreement;
(c) relevant Standards/Guidelines contained in nationally accepted codes; and
(d) Good Industry Practice.

3. Safety measures during Operation and Maintenance Period

3.1. Concessionaire is expected to pre-plan all work to minimize the potential for personal injury and property damage

3.2. Develop the plan in a Project specific nature, which is designed to anticipate and identify hazards before work begins. Know in advance what measures will be taken to eliminate hazards or adequately control the anticipated risks for each scope of work. This information shall include, but is not limited to: scope of work, sequence of activities, site specific fall protection, high angle rescue procedures, safety control methods, training records, competent persons, lead abatement, asbestos abatement and excavations. The planning does not stop at the pre- planning stage, but is a continuous process of assessment and evaluation. When changes occur or new hazards are identified during the course of the Project, the work should be suspended while the plan is revised.

3.3. Ensure all subcontractors, suppliers and vendors are informed of their obligations with regard to safety and of the Contractor Safety Requirements.

3.4. Plan and execute all work to comply with the stated objectives and safety requirements contained in the Contractor Safety Requirements, contract provisions, federal, state, and local laws and regulations, and standards.

3.5. Concessionaire or their contractors/subcontractors with 25 or more employees on a single shift will establish a full time position of a Contractor Safety Manager to perform safety inspections and training services. In addition, for every additional 100-job site employees added, an additional Safety Management Representative shall be required. In the event that the Contractor has less than 25 employees, the contractor shall appoint an onsite person who along with other

concurrent duties shall serve as the Contractor's Safety Representative.

3.6. Concessionaire shall maintain its own orientation program for its employees that shall include as a minimum a review of (1) hazards present in the area in which they will be working and (2) the personal protective equipment and apparel the workers will be required to use or wear as specified under Occupational Safety and Health Administration (OSHA).

3.7. The Concessionaire shall keep a copy of every FIR recorded by the Police with respect to any accident occurring on or about the Project. In addition, the Concessionaire shall also collect data for all cases of accidents not recorded by the Police. The information so collected shall be summarised and submitted to the Authority and the State Government at the conclusion of every [month/quarter].

3.8. The Concessionaire shall submit to the Authority before the [31st (thirty first) March] of each year, an annual report (in 3 (three) copies) containing, without limitation, a detailed listing and analysis of all accidents of the preceding Financial Year and the measures taken by the Concessionaire pursuant to the provisions of Clause 3.1 of this Schedule for averting or minimising such accidents in future.

3.9. Concessionaire shall provide and maintain a chemical and flammable material storage area as described in the Contractor Safety Requirements. Be responsible for the control, availability and use of necessary safety equipment, including personal Protective equipment (PPE) and apparels for the Concessionaire employees.

3.10. Take an active part in all supervisory safety meetings, including the discussion of observed unsafe work practices or conditions and a review of any incidents and corrective actions. Additionally, encourage, solicit and follow up on safety related suggestions from Concessionaire employees.

3.11. Report all injuries and incidents in a timely manner in accordance with federal and/or state laws and regulations and the Contractor Safety Requirements. Analyze all incidents and implement immediate corrective action.

3.12. Provide job supervisors with appropriate training materials to conduct weekly safety meetings and attend said meetings to evaluate their effectiveness.

3.13. Review safety meeting reports submitted by job supervisors and take necessary action to ensure that the job supervisors hold meaningful weekly safety meetings.

3.14. Implement safety-training programs for Contractor supervisors and employees applicable to their specific responsibilities.

3.15. Maintain a list on-site of personnel available for first aid and emergency treatment for injured Contractor employees.

3.16. Concessionaire will be responsible for providing a safety orientation training session for all workers before they are allowed to begin work. The orientation safety training will be conducted by the authorized representative as suggested by the Authority and will include a summary of the Contractor Safety requirements/ Heads- Up Safety Training and awareness.

3.17. At a minimum Contractor representative to adequately train its employees according to applicable safety standards. This training may include but is not limited to: fall protection, fire watch, scaffolds, forklifts, excavation, ladders, confined space entry, respiratory protection,

OSHA-PSM (Process Safety Management), grounding, shoring and traffic control etc.

3.18. In the event of a work-related incident resulting in a Contractor employee injury or near miss, Contractors shall notify their Appointed Representative immediately.

3.19. Contractors shall provide the appointed representative with an initial report of the incident, in writing, within 24 hours of the accident. Hard copy or electronic formats are acceptable.

3.20. Contractors shall provide a completed accident investigation report within three (3) working days of the incident. In the event, their investigation requires more time to investigate due to the complexity of the incident, Contractors shall communicate to the appointed Representative in writing including intimation to higher authorities of AUTHORITY. This communication shall include the issues causing the delay and an estimated investigation completion date.

3.21. All first aid injuries shall be documented for record keeping purposes. In the event a first aid case develops into a Contractor employee injury, accident reporting and investigation procedure be initiated as outlined previously.

3.22. In order to maintain a safe and healthy work environment in emergency situations, Concessionaire has developed this emergency action plan to help safeguard Contractor employees while working on AUTHORITY Sites. All Contractor employees will be trained in the use of this plan and informed of their role in implementing it during their required safety orientation training. This policy is mandatory and must be strictly followed by all Contractors and their personnel while working on Sites.

3.23. When notified of an emergency evacuation (an audible alarm/verbal announcement will be used by Concessionaire to alert employees of an evacuation), Contractors must immediately evacuate their personnel from the Project Site, perform a head count and report missing personnel to concerned in- charge of the facility and take appropriate steps for investigation. When evacuating any building, structure or job site, employees should utilize the nearest exit to them. Personnel will remain at the designated site until an all-clear is announced or further evacuation steps are ordered.

3.24. Concessionaire shall comply with the latest revision Safety Rules & Procedures Permit. Contractors shall provide adequate fire protection equipment in each of their storage areas, offices and other temporary structures.

3.25. Concessionaire is responsible for orienting employees on the specific safety rules that must be followed by all persons working on Project Facilities. Other personal protective equipment (PPE) is also required in accordance with the appropriate safety standards and equipment as set by the manufacturer's specifications. A list of the minimum personal protective requirements is as follows:

3.26. The Contractor shall be responsible for providing and ensuring the use of required personal protective equipment for its employees.

a) Approved hard hats, shall be worn at all times while on the Site. It is required that each Contractor use an American National Standards Institute (ANSI) approved hardhat.

b) Safety glasses, which meet applicable ANSI standards, are required at all times while on the Site and should include approved side shields. Only clear safety glasses are allowed to be used inside

buildings or enclosed structures. Shaded goggles or hoods may be used while welding or cutting requires. Prescription safety glasses with self-tinting capabilities may be worn on-site.

c) PPE shall be worn while travelling from the security gate, while travelling through the plants, working outside or otherwise engaged in work at each station, except in areas specifically designated as PPE not required.

d) Contractor‘s vendors and visitors will be required to meet these same standards.

e) Good housekeeping affects safety, quality and production. It is the responsibility of Concessionaire onsite to keep their work area clean. Concessionaires are responsible for trash and debris that is generated by their work. Trash and debris must be collected and placed in proper containers on a daily basis.

3.27 Trash shall not be randomly thrown off a floor or through openings in the floor. Trash chutes, trash boxes, or other approved means such as barricading and/or flagging shall be utilized.

3.28Safety requirements mentioned in the Environment Impact Assessment (EIA) Report shall be compliance.

4. Costs and expenses

Costs and expenses incurred in connection with the Safety Requirements set forth herein, including the provisions of Clause 2 of this Schedule, shall be borne by the Concessionaire in accordance with the provisions of Article 5.1.

Annex - I
(Schedule-5)
Safety
Guidelines

1. System integrity

In the design of the Project Facilities, particular care shall be taken to minimise the likely incidence of failure.

2. Safety management

A safety programme shall be prepared by the Concessionaire once every year to bring out clearly the system of management of checks and maintenance tolerances for various elements comprising the Project and compliance thereof. The programme shall also bring out the nature and extent of staff training and awareness in dealing with such checks and tolerances. [2 (two)] copies of the programme shall be sent to the Independent Engineer within [15 (fifteen)] days of the close of every year.

3. Emergency

A set of emergency procedures shall be formulated to deal with different emergency situations and the operations staff shall be trained to respond appropriately during emergency through periodic simulated exercises as laid down in a manual for management of disasters (the "**Disaster Management Manual"**) to be prepared and published by the Concessionaire prior to [Project COD]. The Concessionaire shall provide 5 (five) copies each of the Disaster Management Manual to the Authority and the State Government and the Independent Engineer no later than [30 (thirty)] days prior to Project COD.

4. Fire safety

4.1. To prevent fire in the Project, the Concessionaire shall use fire resistant materials in the construction thereof and shall avoid use of materials which are to some extent flammable, or which emit smoke and harmful gases when burning.

4.2. To deal with incidents of fire, the Concessionaire shall provide a hydrant based fire-fighting system in conformity with the Good Industry Practices.

5. Surveillance and Safety Manual

The Concessionaire shall, no later than [60 (sixty)] days prior to [Project COD], evolve and adopt a manual for surveillance and safety of the Project, in accordance with Good Industry Practice, and shall comply therewith in respect of the security and safety of the Project, including its gate control, sanitation, fire prevention, environment protection.

6. Watch and Ward

The Concessionaire shall, at its own expense and in accordance with Good Industry Practice, provide and maintain all lighting, fencing, watch and ward arrangements for the safety of the Project and all persons affected by it.

SCHEDULE 6 - DELETED

SCHEDULE 7 - DELETED

SCHEDULE 8 - THE SITES

(See Article 10)

1.1. The Site

1.1.1 Site of the Project shall include the land, buildings, structures and road works as described in this Schedule.

1.1.2 An inventory of the Site including the land, buildings, structures, roadworks, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by Authority Representative and the Concessionaire, and such inventory shall form part of this Schedule.

1.2. Sites for ISWM Facilities in the South Package

1.2.1 Map of the Land for ISWM Facility is as shown below in Annex 1 of Schedule 8.

1.3. Inventory of the Site

1.3.1[to be filled at the time of granting concession]

1.4. Secondary Transportation of MSW shall be carried out for the waste from area as per Annex -2 of Schedule 8.

1.5. No additional land (required for ancillary buildings, extension/ addition to the Project Facilities or for construction of works due to change of Scope of Work) shall be provided by the Authority in accordance with the Agreement.

Annex 1-
Schedule 8

Tentative location of the Package wise Processing plant location

Location of Processing Plant for South Package - Gollahalli

Location (Latitude & Longitude)	**:** 12.81758, 77.58873
Locality	**:** Gollahalli, Karnataka
Area Available (Acre)	**:** 100 Acre (Approx.)
Land Owned by	**:** Quarry and Plain land – PWD

Note: To procure the land parcel on transferable basis from PWD to BSWML at Gollahalli.

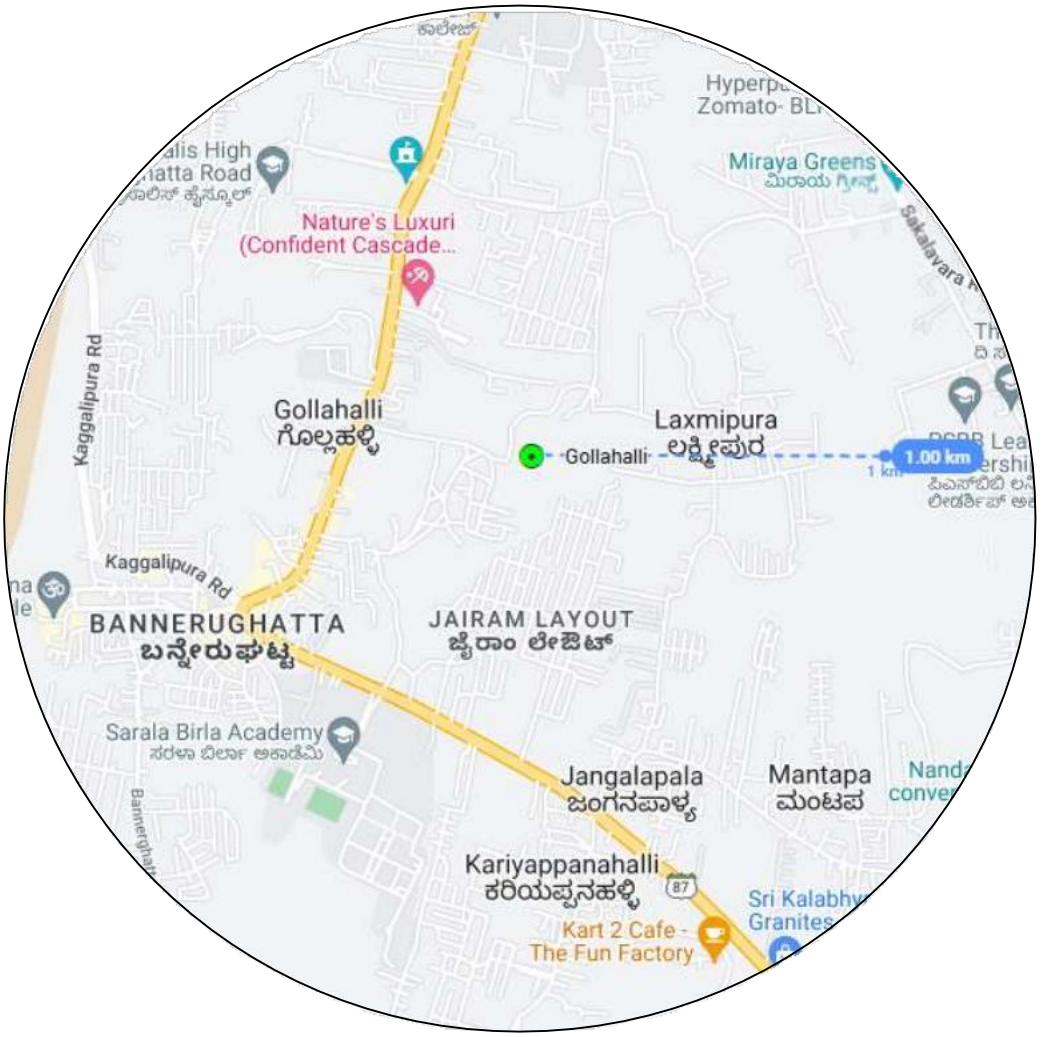
SITE CONDITION

Electricity	**:** Need to be Established
Water Line & Requirements	**:** Need to be Established
Sewerage Line connection	**:** Need to be Established
Access Road	**:** Available

Topography of the proposed processing plant Location

Location (Latitude & Longitude) : 12.81758, 77.58873

Tentative location of the Package wise Processing plant location



Location of Processing Plant for South Package – Gollahalli

Annex 2
Schedule 8

South Package: RR Nagar Zone, Mahadevpura Zone, South Zone and Bommanahalli Zone

Table 1 The distribution of Ward and Population in South Package.

Zone	Division	Sub-Division	Population 2023
Rajarajeshwari Nagar Zone	Rajarajeshwari Nagar	Rajarajeshwari Nagar BBMP	125796
		Laggere BBMP	105824
		Lakshmidevi Nagar BBMP	127225
	Yeshwanthpur	Yeshwanthpur BBMP	357582
		Yeshvanthapura Bangalore Urban District (Bangalore North)	118076
	Kengeri	Kengeri BBMP	181460
		Herohalli BBMP	265838
		Bangalore South Bangalore Urban District (Bangalore Rural)	110482
		Anekal Bangalore Urban District (Bangalore Rural)	113315
Mahadevapura Zone	K.R. Puram	Horamavu BBMP	117999
		K.R. Puram BBMP	255400
		K.R. Pura Bangalore Urban District (Bangalore North)	6467
		HAL Airport BBMP	325944
	Mahadevapura	Hoodi BBMP	131283
		Whitefield BBMP	177006
		Marathalli BBMP	367526
		Mahadevpura Bangalore Urban District (Bangalore Central)	38018
South Zone	Padmanabhanagar	Padmanabhanagar BBMP	227679
		Banashankari BBMP	251602
	Jayanagar	Jayanagar BBMP	241996
		J P Nagar BBMP	117564
	BTM Layout	BTM BBMP	239583
		Koromangala BBMP	272495
	Chickpet	Kempegowdanagar BBMP	242101
		Hombegowdanagar BBMP	124498
	Vijayanagar	Vijayanagar BBMP	228482
		Gali Anjaneyaswamy Temple BBMP	278994
	Basavanagudi	Basavanagudi BBMP	179680
		Girinagar BBMP	200880
Bommanahalli Zone	Bommanahalli	H S R Layout BBMP	113603
		Bommanahalli BBMP	177629

Zone	Division	Sub-Division	Population 2023
		Bommanahalli Bangalore Urban District (Bangalore South)	1274
		Arakere BBMP	434008
	Uttarahalli	Uttarahalli BBMP	126128
		Yelachenahalli BBMP	119501
		Anjanapura BBMP	121718
		Begur BBMP	64187
	Anjanapura	Begur BBMP	54763
			209266
Estimated Total BBMP + BUD Population			**69,52,872**
Estimated Floating Population in South Package			**4,89,207**
Estimated Total Population in South Package (2023)			**74,42,079**
Estimated Total Population in South Package (2030)			**9,662,193**

SCHEDULE 9 - SUBSTITUTION AGREEMENT

(See Article 12.3)

THIS SUBSTITUTION AGREEMENT is entered into on this the …….. .day of …….. 20….

AMONGST

1. The **State Department of [Urban Development]** of [Name of the State] represented by [•], and having its offices at [•] (hereinafter referred to as the "**State Government**" which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns);

2. The Municipal Corporation of [**], incorporated under the [Act under which Authority has been established], represented by its Municipal Commissioner/Managing Director and having its principal offices at ***, India (hereinafter referred to as the "**Authority**" which expression shall unless repugnant to the context or meaning thereof include its administrators, successors and assigns);

3. LIMITED, a company incorporated under the provisions of the Companies Act, 2013 and having its registered office at ……., (hereinafter referred to as the "**Concessionaire**" which expression shall unless repugnant to the context or meaning thereof include its successors and permitted assigns and substitutes);

4. ……. (name and particulars of Lenders" Representative) and having its registered office at ……, acting for and on behalf of the Senior Lenders. .....(name) as their duly authorised agent with regard to matters arising out of or in relation to this Agreement (hereinafter referred to as the "**Lenders' Representative**", which expression shall unless repugnant to the context or meaning thereof include its successors and substitutes);

WHEREAS:

(A) The Authority has entered into a Concession Agreement dated …..... with the Concessionaire (the "**Concession Agreement**") for development and operation of integrated solid waste management system and reclamation of land through bio- remediation of legacy waste on hybrid annuity basis at_____, in the State of [Name of the State], and a copy of which is annexed hereto and marked as Annex-A to form part of this Agreement.

(B) Senior Lenders have agreed to finance the Project in accordance with the terms and conditions set forth in the Financing Agreements.

(C) Senior Lenders have requested the Authority to enter into this Substitution Agreement for securing their interests through assignment, transfer and substitution of the Concession to a Nominated Company in accordance with the provisions of this Agreement and the Concession Agreement.

(D) In order to enable implementation of the Project including its financing, construction, operation and maintenance, the Authority has agreed and undertaken to transfer and assign the Concession to a Nominated Company in accordance with the terms and conditions set forth in this Agreement and the Concession Agreement.

NOW, **THEREFORE**, in consideration of the foregoing and the respective covenants and agreements set forth in this Agreement, the receipt and sufficiency of which is hereby acknowledged, and intending to be legally bound hereby, the Parties agree as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 Definitions

In this Substitution Agreement, the following words and expressions shall, unless repugnant to the context or meaning thereof, have the meaning hereinafter respectively assigned to them:

"**Agreement**" means this Substitution Agreement and any amendment thereto made in accordance with the provisions contained in this Agreement;

"**Financial Default**" means occurrence of a material breach of the terms and conditions of the Financing Agreements or a continuous default in Debt Service by the Concessionaire for a minimum period of 3 (three)months;

"**Lenders' Representative**" means the person referred to as the Lenders‟ Representative in the foregoing Recitals;

"**Nominated Company**" means a company, incorporated under the provisions of the Companies Act, 2013, selected by the Lenders‟ Representative, on behalf of Senior Lenders, and proposed to the Authority for assignment/transfer of the Concession as provided in this Agreement;

"**Notice of Financial Default**" shall have the meaning ascribed thereto in Clause 3.2.1; and

"**Parties**" means the parties to this Agreement collectively and "Party" shall mean any of the Parties to this Agreement individually.

1.2 Interpretation

1.2.1 References to Lenders‟ Representative shall, unless repugnant to the context or meaning thereof, mean references to the Lenders‟ Representative, acting for and on behalf of Senior Lenders.

1.2.2 References to Clauses are, unless stated otherwise, references to Clauses of this Agreement.

1.2.3 The words and expressions beginning with capital letters and defined in this Agreement shall have the meaning ascribed thereto herein, and the words and expressions used in this Agreement and not defined herein but defined in the Concession Agreement shall, unless repugnant to the

context, have the meaning ascribed thereto in the Concession Agreement.

1.2.4 The rules of interpretation stated in Clauses 1.2, 1.3 and 1.4 of the Concession Agreement shall apply, *mutatis mutandis*, to this Agreement.

2. ASSIGNMENT

2.1 Assignment of rights and title

The Concessionaire hereby agrees to assign the rights, title and interest in the Concession to, and in favour of, the Lenders‟ Representative pursuant to and in accordance with the provisions of this Agreement and the Concession Agreement by way of security in respect of financing by the Senior Lenders under the Financing Agreements.

3. SUBSTITUTION OF THE CONCESSIONAIRE

3.1 Rights of substitution

3.1.1 Pursuant to the rights, title and interest assigned under Clause 2.1, the Lenders‟ Representative shall be entitled to substitute the Concessionaire by a Nominated Company under and in accordance with the provisions of this Agreement and the Concession Agreement.

3.1.2 The Authority hereby agrees to substitute the Concessionaire by endorsement on the Concession Agreement in favour of the Nominated Company selected by the Lenders‟ Representative in accordance with this Agreement. (For the avoidance of doubt, the Senior Lenders or the Lenders‟ Representative shall not be entitled to operate and maintain the Project at _____as Concessionaire either individually or collectively).

3.2 Substitution upon occurrence of Financial Default

3.2.1 Upon occurrence of a Financial Default, the Lenders‟ Representative may issue a notice to the Concessionaire (the "**Notice of Financial Default**") along with particulars thereof, and send a copy to the Authority for its information and record. A Notice of Financial Default under this Clause 3 shall be conclusive evidence of such Financial Default and it shall be final and binding upon the Concessionaire for the purposes of this Agreement.

3.2.2 Upon issue of a Notice of Financial Default hereunder, the Lenders‟ Representative may, without prejudice to any of its rights or remedies under this Agreement or the Financing Agreements, substitute the Concessionaire by a Nominated Company in accordance with the provisions of this Agreement.

3.2.3 At any time after the Lenders‟ Representative has issued a Notice of Financial Default, it may by notice require the Authority to suspend all the rights of the Concessionaire and undertake the operation and maintenance of the facility in accordance with the provisions of the Concession Agreement, and upon receipt of such notice, the State Government or the Authority shall undertake Suspension under and in accordance with the provisions of the Concession Agreement. The aforesaid Suspension shall be revoked upon substitution of the Concessionaire by a Nominated Company, and in the event such substitution is not completed within 180 (one hundred and eighty) days from the date of such Suspension, the State Government or the Authority may terminate the Concession Agreement forthwith by issuing a Concession Period Notice in accordance with the provisions of the Concession Agreement; Provided that upon written request

from the Lenders‟ Representative and the Concessionaire, the State Government or the Authority may extend the aforesaid period of 180 (one hundred and eighty) days by a period not exceeding 90 (ninety) days. For the avoidance of doubt, the Authority expressly agrees and undertakes to terminate the Concession Agreement forthwith, upon receipt of a written request from the Lenders‟ Representative at any time after 240 (two hundred and forty) days from the date of Suspension hereunder.

3.3 Substitution upon occurrence of Concessionaire Default

3.3.1 Upon occurrence of a Concessionaire Default, the State Government or the Authority shall by a notice inform the Lenders‟ Representative of its intention to issue a Concession Period Notice and grant 15 (fifteen) days time to the Lenders‟ Representative to make a representation, stating the intention to substitute the Concessionaire by a Nominated Company.

3.3.2 In the event that the Lenders‟ Representative makes a representation to the State Government or the Authority within the period of 15 (fifteen) days specified in Clause 3.3.1, stating that it intends to substitute the Concessionaire by a Nominated Company, the Lenders‟ Representative shall be entitled to undertake and complete the substitution of the Concessionaire by a Nominated Company in accordance with the provisions of this Agreement within a period of 180 (one hundred and eighty) days from the date of such representation, the State Government or the Authority shall either withhold Concession Period or undertake Suspension for the aforesaid period of 180 (one hundred and eighty) days; Provided that upon written request from the Lenders‟ Representative and the Concessionaire, the State Government or the Authority shall extend the aforesaid period of 180 (one hundred and eighty) days by a period not exceeding 90 (ninety) days.

3.4 Procedure for substitution

3.4.1 The State Government, the Authority and the Concessionaire hereby agree that on or after the date of Notice of Financial Default or the date of representation to the Authority under Clause 3.3.2, as the case may be, the Lenders‟ Representative may, without prejudice to any of the other rights or remedies of the Senior Lenders, invite, negotiate and procure offers, either by private negotiations or public auction or tenders for the take over and transfer of the facilities including the Concession to the Nominated Company upon such Nominated Company‟s assumption of the liabilities and obligations of the Concessionaire towards the Authority under the Concession Agreement and towards the Senior Lenders under the Financing Agreements.

3.4.2 To be eligible for substitution in place of the Concessionaire, the Nominated Company shall be required to fulfill the eligibility criteria that were laid down by the Authority for short listing the bidders for award of the Concession.

3.4.3 Upon selection of a Nominated Company, the Lenders‟ Representative shall request the State government and the Authority to:

(a) accede to transfer to the Nominated Company the right to construct, operate and maintain the Project facilities in accordance with the provisions of the Concession Agreement;

(b) endorse and transfer the Concession to the Nominated Company, on the same terms and conditions, for the residual Concession Period; and

(c) enter into a Substitution Agreement with the Lenders‟ Representative and the Nominated Company on the same terms as are contained in this Agreement.

3.4.4 If the State Government or the Authority has any objection to the transfer of Concession in favour

of the Nominated Company in accordance with this Agreement, it shall within 15 (fifteen) days from the date of proposal made by the Lenders‟ Representative, give a reasoned order after hearing the Lenders‟ Representative. If no such objection is raised by the State Government or the Authority, the Nominated Company shall be deemed to have been accepted. The State Government or the Authority thereupon shall transfer and endorse the Concession within 15 (fifteen) days of its acceptance/deemed acceptance of the Nominated Company; Provided that in the event of such objection by the State Government or the Authority, the Lenders‟ Representative may propose another Nominated Company whereupon the procedure set forth in this Clause 3.4 shall be followed for substitution of such Nominated Company in place of the Concessionaire.

3.5 Selection to be binding

The decision of the Lenders‟ Representative, the Authority in selection of the Nominated Company shall be final and binding on the Concessionaire. The Concessionaire irrevocably agrees and waives any right to challenge the actions of the Lenders‟ Representative or the Senior Lenders or the State Government or the Authority taken pursuant to this Agreement including the transfer/assignment of the Concession in favour of the Nominated Company. The Concessionaire agrees and confirms that it shall not have any right to seek revaluation of assets of the Project or the Concessionaire's shares. It is hereby acknowledged by the Parties that the rights of the Lenders‟ Representative are irrevocable and shall not be contested in any proceedings before any court or the State Government or the Authority and the Concessionaire shall have no right or remedy to prevent, obstruct or restrain the State Government or the Authority or the Lenders‟ Representative from affecting or causing the transfer by substitution and endorsement of the Concession as requested by the Lenders‟ Representative.

4. PROJECT AGREEMENTS

4.1 Substitution of Nominated Company in Project Agreements

The Concessionaire shall ensure and procure that each Project Agreement contains provisions that entitle the Nominated Company to step into such Project Agreement, in its consent, in place and substitution of the Concessionaire in the event of such Nominated Company's assumption of the liabilities and obligations of the Concessionaire under the Concession Agreement.

5. TERMINATION OF CONCESSION AGREEMENT

5.1 Concession Period upon occurrence of Financial Default

At any time after issue of a Notice of Financial Default, the Lenders‟ Representative may by a notice in writing require the State Government or the Authority to terminate the Concession Agreement forthwith, and upon receipt of such notice, the State Government or the Authority shall undertake Concession Period under and in accordance with the Agreement.

5.2 Concession Period when no Nominated Company is selected

In the event that no Nominated Company acceptable to the Authority is selected and recommended by the Lenders‟ Representative within the period of 180 (one hundred and eighty) days or any extension thereof as set forth in Clause 3.3.2, the State Government or the Authority may terminate the Concession Agreement forthwith in accordance with the provisions thereof.

5.3 Realization of Debt Due

The Authority and the Concessionaire hereby acknowledge and agree that, without prejudice to their any other right or remedy, the Lenders‟ Representative is entitled to receive from the Concessionaire, without any further reference to or consent of the Concessionaire, the Debt Due upon Concession Period of the Concession Agreement. For realisation of the Debt Due, the Lenders‟ Representative shall be entitled to make its claim from the Escrow Account in accordance with the provisions of the Concession Agreement and the Escrow Agreement.

6. DURATION OF THE AGREEMENT

6.1 Duration of the Agreement

This Agreement shall come into force from the date hereof and shall expire at the earliest to occur of the following events:

(a)) Concession Period of the Agreement; or

(b) no sum remains to be advanced, or is outstanding to the Senior Lenders, under the Financing Agreements.

7. INDEMNITY

7.1 General indemnity

7.1.1 The Concessionaire will indemnify, defend and hold the Authority and the Lenders' Representative harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense of whatever kind and nature arising out of any breach by the Concessionaire of any of its obligations under this Agreement or on account of failure of the Concessionaire to comply with Applicable Laws and Applicable Permits.

7.1.2 The Authority will indemnify, defend and hold the Concessionaire harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of failure of the Authority to fulfill any of its obligations under this Agreement, materially and adversely affecting the performance of the Concessionaire's obligations under the Concession Agreement or this Agreement, other than any loss, damage, cost and expense, arising out of acts done in discharge of their lawful functions by the Authority, its officers, servants and agents.

7.1.3 The Lenders‟ Representative will indemnify, defend and hold the Concessionaire harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of failure of the Lenders‟ Representative to fulfill its obligations under this Agreement, materially and adversely affecting the performance of the Concessionaire's obligations under the Concession Agreement, other than any loss, damage, cost and expense, arising out of acts done in discharge of their lawful functions by the Lenders‟ Representative, its officers, servants and agents.

7.2 Notice and contest of claims

In the event that any Party hereto receives a claim from a third party in respect of which it is entitled to the benefit of an indemnity under Clause 7.1 or in respect of which it is entitled to reimbursement (the "**Indemnified Party**"), it shall notify the other Party responsible for indemnifying such claim hereunder (the "**Indemnifying Party**") within 15 (fifteen) days of receipt of the claim and shall not settle or pay the claim without the prior approval of the Indemnifying Party, such approval not to be unreasonably withheld or delayed. In the event that

the Indemnifying Party wishes to contest or dispute the claim, it may conduct the proceedings in the name of the Indemnified Party and shall bear all costs involved in contesting the same. The Indemnified Party shall provide all cooperation and assistance in contesting any claim and shall sign all such writings and documents as the Indemnifying Party may reasonably require.

8. DISPUTE RESOLUTION

8.1 Dispute resolution

8.1.1 Any dispute, difference or claim arising out of or in connection with this Agreement which is not resolved amicably shall be decided by reference to the dispute resolution by the ACS, UDD. Failing resolution through this process, the matter may be referred to the competent civil courts having jurisdiction in Bengaluru.

8.1.2 The venue of arbitration shall be [•] and the language of arbitration shall be English.

9. MISCELLANEOUS PROVISIONS

9.1 Governing law and jurisdiction

This Agreement shall be construed and interpreted in accordance with and governed by the laws of India, and the Courts at [Government of Karnataka, Hon'ble High court] shall have jurisdiction over all matters arising out of or relating to this Agreement.

9.2 Waiver of immunity

The Authority unconditionally and irrevocably:

(a) agrees that the execution, delivery and performance by it of this Agreement constitute commercial acts done and performed for commercial purpose;

(b) agrees that, should any proceedings be brought against it or its assets, property or revenues in any jurisdiction in relation to this Agreement or any transaction contemplated by this Agreement, no immunity from such proceedings shall be claimed by or on behalf of the State Government or the Authority with respect to its assets;

(c) waives any right of immunity which it or its assets, property or revenues now has, may acquire in the future or which may be attributed to it in any jurisdiction; and

(d) consents generally in respect of the enforcement of any judgment or award against it in any such proceedings to the giving of any relief or the issue of any process in any jurisdiction in connection with such proceedings (including the making, enforcement or execution against it or in respect of any assets, property or revenues whatsoever irrespective of their use or intended use of any order or judgment that may be made or given in connection therewith).

9.3 Priority of agreements

In the event of any conflict between the Concession Agreement and this Agreement, the provisions contained in the Concession Agreement shall prevail over this Agreement.

9.4 Alteration of terms

All additions, amendments, modifications and variations to this Agreement shall be effectual and

binding only if in writing and signed by the duly authorised representatives of the Parties.

9.5 Waiver

9.5.1 Waiver by any Party of a default by another Party in the observance and performance of any provision of or obligations under this Agreement:

(a) shall not operate or be construed as a waiver of any other or subsequent default hereof or of other provisions of or obligations under this Agreement;

(b) shall not be effective unless it is in writing and executed by a duly authorised representative of the Party; and

(c) shall not affect the validity or enforceability of this Agreement in any manner.

9.5.2 Neither the failure by either Party to insist on any occasion upon the performance of the terms, conditions and provisions of this Agreement or any obligation there under nor time or other indulgence granted by a Party to another Party shall be treated or deemed as waiver of such breach or acceptance of any variation or the relinquishment of any such right hereunder.

9.6 No third party beneficiaries

This Agreement is solely for the benefit of the Parties and no other person or entity shall have any rights hereunder.

9.7 Survival

9.7.1 Concession Period of this Agreement:

(a) shall not relieve the Parties of any obligations hereunder which expressly or by implication survive termination hereof; and

(b) except as otherwise provided in any provision of this Agreement expressly limiting the liability of either Party, shall not relieve either Party of any obligations or liabilities for loss or damage to the other Party arising out of or caused by acts or omissions of such Party prior to the effectiveness of such termination or arising out of such termination.

9.7.2 All obligations surviving the cancellation, expiration or termination of this Agreement shall only survive for a period of 3 (three) years following the date of such termination or expiry of this Agreement.

9.8 Severability

If for any reason whatever any provision of this Agreement is or becomes invalid, illegal or unenforceable or is declared by any court of competent jurisdiction or any other instrumentality to be invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions shall not be affected in any manner, and the Parties will negotiate in good faith with a view to agreeing to one or more provisions which may be substituted for such invalid, unenforceable or illegal provisions, as nearly as is practicable to such invalid, illegal or unenforceable provision. Failure to agree upon any such provisions shall not be subject to dispute resolution under Clause 8 of this Agreement or otherwise.

9.9 Successors and assigns

This Agreement shall be binding on and shall insure to the benefit of the Parties and their respective

successors and permitted assigns.

9.10 Notices

All notices or other communications to be given or made under this Agreement shall be in writing, shall either be delivered personally or sent by courier or registered post with an additional copy to be sent by facsimile or e-mail. The address for service of each Party, its facsimile number and e-mail address are set out under its name on the signing pages hereto. A notice shall be effective upon actual receipt thereof, save that where it is received after 5.30 (five thirty) p.m. on any day, or on a day that is a public holiday, the notice shall be deemed to be received on the first working day following the date of actual receipt. Without prejudice to the foregoing, a Party giving or making a notice or communication by facsimile or e-mail shall promptly deliver a copy thereof personally, or send it by courier or registered post to the addressee of such notice or communication. It is hereby agreed and acknowledged that any Party may by notice change the address to which such notices and communications to it are to be delivered or mailed. Such change shall be effective when all the Parties have notice of it.

9.11 Language

All notices, certificates, correspondence and proceedings under or in connection with this Agreement shall be in English.

9.12 Authorised representatives

Each of the Parties shall by notice in writing designate their respective authorised representatives through whom only all communications shall be made. A Party hereto shall be entitled to remove and/or substitute or make fresh appointment of such authorised representative by similar notice.

9.13 Original Document

This Agreement may be executed in three counterparts, each of which when executed and delivered shall constitute an original of this Agreement.

IN WITNESS WHEREOF THE PARTIES HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

THE COMMON SEAL OF CONCESSIONAIRE has been affixed pursuant to the resolution passed by the Board of Directors of the Concessionaire at its meeting held on the …… day of 20…… hereunto affixed in the presence of……, Director, who has signed these presents in token thereof and ……, Company Secretary / Authorised Officer who has countersigned the same in token thereof :$

SIGNED, SEALED AND DELIVERED

For and on behalf of

NAME OF THE STATE GOVERNMENT by:

(Signature) (Name) (Designation) (Address) (Fax No.)
(E-mail address)

SIGNED, SEALED AND DELIVERED

For and on behalf of

NAME OF THE AUTHORITY by:

(Signature) (Name) (Designation) (Address) (Fax No.)
(E-mail address)

SIGNED, SEALED AND DELIVERED

For and on behalf of

SENIOR LENDERS by the Lenders' Representative:
(Signature)
(Name)
(Designation)
(Address)
(Fax)
(E-mail address)

In the presence of:

1. 2.

$To be affixed in accordance with the articles of association of the Concessionaire.

SCHEDULE 10 - SCOPE OF WORK OF INDEPENDENT ENGINEER

(See Article 13)

1. The Independent Engineer shall assist the Authority in supervising the construction, development, operation and maintenance of the Project Facilities and shall work closely with the Authority to monitor compliance with the KPIs. The detailed scope of work of the Independent Engineer, to be read in conjunction with the provisions of the Concession Agreement, is outlined below:

1.1. The Independent Engineer shall review the Designs and Drawings to be provided by the Concessionaire. These will include, inter-alia, the site layout plan, process design, drawings, structural calculations, mechanical, electrical and instrumentation works, quality plans, implementation schedules, and the environment, health & safety plans for all Project Facilities. On the basis of its review, the Independent Engineer shall provide its recommendations to the Authority.

1.2. During relevant Construction Periods, the Independent Engineer shall inspect the relevant Project Facilities at least once a month and prepare an inspection report, setting out the progress of the construction of the relevant Project Facilities, defects or deficiencies, if any, and status of compliance with the Construction Plan, Technical Specifications and Designs and Drawings and the Guaranteed Interim Availability.

1.3. The Independent Engineer shall be responsible to monitor the implementation of the approved environment, health & safety plan by the Concessionaire. The Independent Engineer shall also verify the material safety data sheets of hazardous chemicals, if any.

1.4. The Independent Engineer shall review the construction progress of the Project as per the Project Milestones proposed by the Concessionaire and provide necessary recommendations to the Authority for the purpose of issuance of Project Milestone Certificates.

1.5. At the end of the Construction Period for different Project Facilities, the Independent Engineer shall review the relevant Project Facilities and provide necessary recommendations to the Authority with regards to the issuance of the respective Construction Completion Certificates to the Concessionaire to certify completion of construction of such Project Facilities, and the satisfaction of all other conditions required to be fulfilled by the Concessionaire.

1.6. The Independent Engineer shall monitor the Trial Operations of different Project Facilities during their respective Trial Periods and provide necessary recommendations to the Authority for the purpose of the issuance of the respective COD Certificates to the Concessionaire. The review shall be based on the Trial Operations Procedures outlined in the Concession Agreement and include the following:

(a) Verify quality of installations, operation of equipment and workmanship;
(b) [Verify the Standards/quality of the By-Products;]
(c) [Verify the consumption of electricity and generation of power, if any, vis-à-vis the Guaranteed Energy Consumption.]

1.7. The Independent Engineer shall review the O&M Manual and the Scheduled Maintenance Program submitted by the Concessionaire and provide its recommendations to the Authority.

1.8. During the O&M Period, the Independent Engineer shall inspect all the Project Facilities at least once a month and prepare an inspection report, setting out the defects or deficiencies, if any, and status of compliance with the relevant KPIs and Standards.

1.9. The Independent Engineer shall inspect laboratories where tests are conducted on samples to ensure conformance and compliance with laboratory procedures and requirements.

1.10. The Independent Engineer shall review the reports generated form the Online Monitoring Systems of different Project Facilities to assess adherence to their relevant KPIs and submit the monthly KPI Adherence Reports to the Authority.

1.11. The Independent Engineer shall assist the Authority in estimating the interim Availability Liquidated Damages and Delay Liquidated Damages, as applicable.

1.12. The Independent Engineer shall assist Authority in estimating the Liquidated Damages, as applicable.

1.13. During the Concession Period, and as requested by the Authority, the Independent Engineer shall provide its opinion and assessment on the implications of the events related to Emergency, Change in Law, Force Majeure, Fundamental Change in Law, Minor Casualty, Total Casualty, Variation and Unforeseen Site Conditions.

1.14. The Independent Engineer shall participate in the survey to determine the Hand-back Conditions as per the Hand-back Requirements. It shall review the survey report of the Hand-back Conditions submitted by the Concessionaire and provide its recommendations to the Authority on the compliance with the Hand-back Requirements.

The Independent Engineer ("IE") is expected to play a positive and independent role in discharging its functions, thereby facilitating the smooth implementation and operation of the Project Facilities during the Implementation Period and Concession Period. The Independent Engineer shall approve the assigned activities and shall make recommendations to the Authority for its approval. Broadly, the role of the Independent Engineer is to:

Review, and apprise the DPR and shall make recommendations to the Authority for its approval Review and approve the activities associated with Design, Construction, Operation and Maintenance of the Project Facilities to ensure compliance by the Concessionaire as per the Approved DPR;
Shall make recommendations to the Authority for disbursement of funds for Construction Works during Implementation Period; Report to the Parties on the various physical, technical and financial aspects of the Project based on inspections, site visits and Tests; Assist the Parties in arriving at an amicable settlement of disputes, should the need arise. Review matters related to safety and environment, health and social management measures adopted by the Concessionaire for the Project;
Shall appoint relevant staff/personnel for daily monitoring of all operations at ISWM Facility, and shall generate a Daily Monitoring Report for the same. Shall continuously monitor the operations at the weighbridges, authenticate the Daily Weight Sheet submitted by the Concessionaire and shall make recommendations to the Authority for approval Shall make recommendations to the Authority for the tipping fee, as well as for penalties based on the Concessionaire's performance, to be paid to the Concessionaire; and Shall make recommendations to the MC for the apportionment of tipping fee payable by participating AUTHORITY's. Shall ensure the involvement of RWAs/ Authority/ AUTHORITY officials for the monitoring of the performance of the Concessionaire by issuing **"Challan"** books to these personnel to ensure proper monitoring.

Scope of Services

The scope of services to be provided by the Independent Engineer is detailed in the subsequent

subsections of this clause and in addition to the services as detailed hereunder the IE shall also discharge duties as desired by Authority from time to time.

Implementation Period - Planning Phase: -

Ensure that the DPR submitted by the Concessionaire is in compliance with the Scope of Work of the Concessionaire as well as various requirements of the Concession Agreement, including those specified in Schedules 1 to 14, suggest the Concessionaire for any changes and shall make recommendation to the Authority for approval. On receipt of DPR from the Concessionaire, the Independent Engineer shall make recommendations, in writing, to the Concessionaire for any changes, or modifications, if any, to be made in the DPR within 7 (Seven days). The Independent Engineer shall review any modified Drawings or supporting Documents sent to it by the Concessionaire and furnish its comments within 7 (seven) days of receiving such Drawings or documents. Shall review and recommend to the Authority for any changes applied for by the Concessionaire to the Approved DPR. The Independent Engineer shall approve the revised DPR, after consultations with the Concessionaire, within a period of 7 (Seven) days of receipt of revised DPR. Ensures, as the case may be, incorporation of comments and modification suggested by Authority or any Competent Authority; Constantly monitor the progress of Environmental Clearance ("EC") and apprise Authority of progress achieved by Concessionaire every fortnight; Approve the design and drawing of waste processing, material recovery, system of disposal of rejects from processing etc.

Implementation Period - Construction Phase: -

The IE would monitor, in accordance with Good Industry Practice, the progress in implementation of the project activities Waste Processing Facility and the Landfill Facility and ensure compliance with the Construction Requirements. For this purpose, the Independent Engineer shall undertake, inter alia, the following activities and where appropriate make suitable suggestions:

Provide the services of a full-time resident project representative during the period commencing from 7 seven days from the date of appointment of the IE until the expiry of the IE's appointment; Provide administration of the Concession Agreement in full and in complete accordance with applicable laws; Shall assist Authority in approving subcontractor if the request has been made by Concessionaire for the same for some part of the Project; Act on the Authority's behalf as the Authority's representative regarding all contact along with the Concessionaire unless expressly indicated otherwise; The IE shall attend regular meetings ("Project Review Meetings" or "PRMs") with the Authority and the Concessionaire, to be held at least once in every two week during the Implementation Period to report on progress and quality of work performed by the Concessionaire and to discuss problems or other pertinent matters relating to the work. The IE shall take notes at the meetings and provide a copy of the PRM minutes to each person who attended the meeting. The IE shall inform and advise the Authority, in a timely manner all matters relating to the execution, progress, and completeness of the Construction Works on fortnightly basis; Review, approve or disapprove drawings, samples, and other submissions of the Concessionaire to determine compliance and conformance with the requirements of Concession Agreement; Reject work which fails to comply with the specifications and requirements of the Concession Agreement.

Whenever considered necessary or advisable to ensure supervision of corrective action to be taken for reformation of defective work, the IE may require inspection or testing of such work, whether or not such work be then fabricated, installed, or completed, Provide the services of experts to check the quality of materials and the workmanship during the installation/construction of the Construction Works at ISWM Facility and Facilities as per the Approved DPR Reviews all the working drawings of Construction Works submitted by the

Concessionaire and ensure conformity of the same with the Approved DPR Address issues relating to specific site conditions, design modifications, or Concessionaire disputes. Issue Readiness Certificate/ Provisional Readiness Certificates to the Concessionaire for various activities specified in the Agreement after approval from the Authority Ensure the closure of Landfill for Interim Period and shall make recommendation to the Authority for issuance of Closure Certificate for Landfill for Interim Period Ensure the involvement of RWAs/ NGOs/ citizens for implementing, executing and monitoring the project.

The IE shall prepare and submit to Authority and MC, Progress Reports including the following:
Weekly progress of works;
Slippages, if any, in the construction vis-à-vis planned construction schedule and the reasons thereof;

Construction schedule for the succeeding week, Report on Tests Report on notices issued Issues, if any, with regard to the works along with the details of the action taken for the resolution of the same; Photographic record of progress of works over the previous week.

Operations & Maintenance – Interim Phase and Concession Period: -

During this period the Independent Engineer would monitor, in accordance with Good Industry Practice, the Operations & Maintenance activities undertaken by the Concessionaire so as to ensure compliance with the O&M Requirements. The specific activities to be undertaken would include the following:

Provide administration of the contract in full and in complete accordance with applicable laws; Act on the Authority's behalf as the Authority's representative regarding all contact with the Concessionaire a per the Concession Agreement unless expressly indicated otherwise; Designate tests on materials and/or equipment; Review and approve test results and materials and/or equipment used; Interpret the requirements of the Concession Agreement and make decisions regarding performance of the Concessionaire. The IE shall inform and advise the Authority, in a timely manner, all matters relating to the execution, progress, and completeness of works; Reject work which fails to comply with the specifications and requirements of the Agreement.

Whenever considered necessary or advisable to ensure correction of defective work, the IE may require inspection or testing of such work, whether or not such work be then fabricated, installed, or completed; Review, approve or disapprove drawings, samples, and other submissions of the Concessionaire to determine compliance and conformance with the requirements of the Agreement; Shall continuously monitor the operations at the weighbridges, authenticate the Daily Weight Sheet submitted by the Concessionaire and shall make recommendations to the Authority for approval Shall make recommendation for payment of tipping fees based on the daily weight sheet and provisions of the concession agreement to the monitoring committee. Ensure the deployment of all required personnel as per the time schedule to fulfill all the obligation of IE; In addition to the daily responsibilities,
conduct a general inspection of the Project Area at least once a week, along with surprise visits, and as and when exigencies require to ascertain conformity with Construction Requirements and O&M Requirements; Inspect and certify the quality of Municipal Solid Waste ULB wise being collected by Concessionaire, when required Inspect and certify the quality and composition of inert being collected by the Concessionaire, by deploying supervisors at each weighbridge installed in the project; Address issues relating to specific site conditions, design modifications, or Concessionaire disputes. Review the Operation Plan as when required; Periodically review the O&M Manual for adequacy; Monitor Operation and Maintenance activities (including maintenance of Project Facilities and equipment, standards of service, safety and environmental issues) and the overall quality of O&M activities so as to ensure compliance by the Concessionaire with the O&M Requirements, O&M Plan and O&M Manual; Review and ascertain the cost

variation arising as a result of Change in Law and determine the Additional Cost; Undertake a quarterly review of the various records and registers to be maintained by the Concessionaire and suggest suitable remedial measures/ procedures, where necessary.

The IE shall attend regular meetings ("Project Review Meetings" or "PRMs") with the Authority, and the Concessionaire, to be held at least once in every month during the Active Operations Period to report on progress and quality of work performed by the Concessionaire and to discuss problems or other pertinent matters relating to the work. The IE shall take notes at the meetings and provide a copy of the PRM minutes to each person who attended the meeting. The IE shall prepare and submit to Authority, Monthly Project Reports including but not limited to the following:
Report on Tests Report on notices issued Issues, if any, along with the details of the action taken for the resolution of the same;

Hand back of ISWM Facility, equipment, plant, machinery and vehicles to Authority: -

At the time of handing back the Waste Processing Facilities to Authority at the end of Concession Period, the IE shall: monitor and certify compliance with the Handback Requirements as per the Concession Agreement, issue a Certificate of Compliance with Handback Requirements to the Concessionaire,
assist in preparation of the Post Closure Maintenance Plan to Authority;

Meetings, Records and Reporting: -

In addition to attending the meetings hereinabove mentioned, the IE shall also participate in emergency or extraordinary meetings of the Parties held to deal with any Force Majeure Event or other exigencies. IE shall undertake all other duties in accordance with the agreement.

The Independent Engineer shall, in the ordinary course, maintain record of the activities undertaken by it in discharge of its functions and responsibilities. This would include records in respect of the following: Manpower deployed and other organizational arrangements of the Independent Engineer;
Reviews of documents submitted to it by the Concessionaire to meet Construction Requirements and O&M Requirements, such as manuals, Drawings, As Built drawings, schedules, plans and reports; Inspections undertaken and notices/ instructions issued to the Concessionaire;
Review of compliance with Construction Requirements and O&M Requirements; Tests; Concession Payments / Tipping Fees certified; Change in Law; Force Majeure Events; Breaches and defaults by the Parties; and Handback Requirements. The Independent Engineer would be required to submit the following reports to the Parties: Implementation Period
Work Progress Report Readiness Certificate (including Provisional Readiness Certificate) Any supplemental or special report that may be considered necessary by the Independent Engineer (including Force Majeure, and breach of obligations).

Concession Period: -

Monthly Project Report (in accordance with Article CA). Any supplemental or special report that may be considered necessary by the Independent Engineer (including Force Majeure, and breach of obligations) Annual Review of O&M Manual Report on Handback Requirements. Any other report as may be reasonably required by Authority, or as may be necessary to give effect to the provisions of the Agreement.

This TOR shall apply to construction, operation and maintenance of the Project. Whereas the TOR details out the scope of the IE, it is hereby clarified that the Concession Agreement shall govern the scope of the IE. In the event of any deviation in the scope of the IE in the TOR and the Concession Agreement, the scope of the IE as per the Agreement shall be considered. The detailed TOR is provided in Annex -1 - Terms of Reference of the Agreement Providing Independent

SCHEDULE 11 - DRAWINGS

(See Article 15)

Drawings

In compliance with the obligations set forth in Article 14 of this Agreement, the Concessionaire shall furnish to the Authority/Independent Engineer, free of cost, all Drawings listed below:

Sr. No.	Description
1.	**Processing and Treatment Facility**
a)	General layout and construction details such as fencing /boundary wall, building sectional view, etc
b)	Plantation and green belt area with species details
c)	Facilities drawing like internal roads, machinery, weighbridges, maneuvering of vehicles, MRF, processing/ treatment, waste to energy plant, waste to Bio-CNG plant, recycling, etc
d)	Utilities drawing such as security arrangement, restroom, etc
e)	Electric supply, water supply, storm water drainage, leachate treatment,etc
f)	Any additional facilities drawing provided by Concessionaire such as rain water harvesting, solar power or/wind power, etc

Note: Drawing - mean all of the drawings including working drawings for the Project Facilities, designs, calculations and documents pertaining to the Project in accordance with the Construction and O&M Requirements based on the Manual of Design Input.

Additional Drawings

If the Authority/Independent Engineer determines that for discharging its duties and functions under this Agreement, it requires any drawings other than those listed hereinabove, it may by notice require the Concessionaire to furnish such drawings forthwith. Upon receiving a requisition to this effect, the Concessionaire shall promptly prepare and furnish such drawings to the Authority/Independent Engineer as if such drawings formed part of this Schedule 11.

SCHEDULE 12 - CONSTRUCTION COMPLETION SCHEDULE

(See Article 15)

1. Construction Completion Schedule

During the Construction Period, the Concessionaire shall comply with the requirements set forth in this Schedule for each of the Project milestones and Scheduled Construction Completion Date (the "**Project Completion Schedule"**). Within [15 (fifteen)] days of the date of each Project Milestone, the Concessionaire shall notify the Authority of such compliance along with necessary particulars thereof.

The milestones stated in the table below are tentative and Concessionaire can start some of the activities simultaneously to meet the Project Completion Schedule and achieve COD on or before the dates specified in this agreement.
Scheduled COD would be 24 months from the Appointed date.

PROJECT PHASE	MILESTONE/ KEY ACTIVITIES TO BE UNDERTAKEN BY CONCESSIONAIRE	TIME PERIOD (DAYS)
Completion Milestone 1: Planning Phase	a. Undertake technical investigations and / or studies as required. b. Signing of Land Agreement with the Authority. c. Preparation and submission of DPR. d. Seek Authorities approval for the submitted DPR.	120 days or Four Months from the Signing Date of agreement
Completion Milestone 2: Planning Phase	e. Obtain all necessary clearances as defined in Schedule 30. f. Financial Closure with Lenders. g. Obtain Notice to Proceed from the Authority for construction of SWM Facility.	240 days or Eight Months From Execution Date
Completion Milestone 3: Interim Phase	Undertake all the necessary steps, including construction activities required for h. Processing Facility, ancillary structures, amenities i. Landfills. j. Secondary Transport Infrastructure.	15 Months from Execution Date
Completion Milestone 4: Construction	k. Development & construction of SWM Facility.	18 Months for Compost/RDF/ Bio-methanation

Phase	l. Environment management and monitoring.	---------- 24 Months for Waste to Energy Plant From Execution Date
Beyond COD, the Project Milestones shall be as follows:		
Milestone 5: Operations & Maintenance Phase	Secondary Collection & Transportation, Processing, and disposal of MSW in a scientific manner	30 Years (Post COD)
Milestone 6: Post-closure activities	Management and closure of the landfill site as per CPCB and State PCB norms	15 Years post O&M Phase

2. Extension of period

Upon extension of any or all of the aforesaid Project Milestones or the Scheduled Construction Completion Date, as the case may be, under and in accordance with the provisions of this Agreement, the Project Completion Schedule shall be deemed to have been amended accordingly.

SCHEDULE 13 - ENVIRONMENT, HEALTH & SAFETY
(See Article 14)

1. Link to the Environment and Social Management Framework (ESMF) to be followed for Projects

Environmental and Social Management Framework of Project:
http://--____-___-___-

2. Requirements for preparation of ESHS Management Strategies and Implementation Plans (ESHS-MSIP)

The Concessionaire shall submit comprehensive and concise Environmental, Social, Health and Safety Management Strategies and Implementation Plans (ESHS-MSIP). These strategies and plans shall describe in detail the actions, materials, equipment, management processes etc. that will be implemented by the Concessionaire, and its subcontractors.

In developing these strategies and plans, the Concessionaire shall have regard to the ESHS provisions of the Concession Agreement including those as may be more fully described in the following:

a. Works Requirements described in Concession Agreement;

b. Environmental and Social Impact Assessment (ESIA);

c. Environmental and Social Management Plan (ESMP);

d. Consent Conditions (regulatory authority conditions attached to any permits or approvals for the project).

……

Metrics for Progress Reports

The following Metrics should be used for regular reporting:

a. environmental incidents or non-compliances with Concession Agreement requirements, including contamination, pollution or damage to ground or water supplies;

b. health and safety incidents, accidents, injuries and all fatalities that require treatment;

c. interactions with regulators: identify agency, dates, subjects, outcomes (report the negative if none);

d. status of all permits and agreements:

i. work permits: number required, number received, actions taken for those not received;

- *status of permits and consents: list areas/facilities with permits required (quarries, asphalt & batch plants), dates of application, dates issued (actions to follow up if not issued), dates submitted to resident engineer (or equivalent), status of area (waiting for permits, working, abandoned without reclamation, decommissioning plan being implemented, etc.);*

- *list areas with landowner agreements required (borrow and spoil areas, camp sites), dates of agreements, dates submitted to resident engineer (or equivalent);*
- *identify major activities undertaken in each area this month and highlights of environmental and social protection (land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation);*
- *for quarries: status of relocation and compensation (completed, or details of monthly activities and current status).*

e. health and safety supervision:

i. safety officer: number days worked, number of full inspections & partial inspections, reports to construction/project management;

ii. number of workers, work hours, metric of PPE use (percentage of workers with full personal protection equipment (PPE), partial, etc.), worker violations observed (by type of violation, PPE or otherwise), warnings given, repeat warnings given, follow-up actions taken (if any);

f. worker accommodations:

iii. number of expats housed in accommodations, number of locals;

iv. date of last inspection, and highlights of inspection including status of accommodations' compliance with national and local law and good practice, including sanitation, space, etc.;

v. actions taken to recommend/require improved conditions, or to improve conditions.

g. HIV/AIDS: provider of health services, information and/or training, location of clinic, number of non-safety disease or illness treatments and diagnosis (no names to be provided);

h. gender (for expats and locals separately): number of female workers, percentage of workforce, gender issues raised and dealt with (cross-reference grievances or other sections as needed);.

i. training:

vi. number of new workers, number receiving induction training, dates of induction training;

vii. number and dates of toolbox talks, number of workers receiving Occupational Health and Safety (OHS), environmental and social training;

viii. number and dates of HIV/AIDS sensitization training, no. workers receiving training (this month and in the past); same questions for gender sensitization, flaglady/flagman training.

j. environmental and social supervision:

ix. environmentalist: days worked, areas inspected and numbers of inspections of each part of the Facilities created, highlights of activities/findings (including violations of environmental and/or social best practices, actions taken), reports to environmental and/or social specialist/construction/site management;

x. *sociologist: days worked, number of partial and full site inspections of each part of the Facilities created, highlights of activities (including violations of environmental and/or social requirements observed, actions taken), reports to environmental and/or social specialist/construction/site management; and*

xi. *community liaison person(s): days worked (hours community center open), number of people met, highlights of activities (issues raised, etc.), reports to environmental and/or social specialist /construction/site management.*

k. *Grievances: list this month's and unresolved past grievances by date received, complainant, how received, to whom referred to for action, resolution and date (if completed), data resolution reported to complainant, any required follow-up (Cross-reference other sections as needed):*

xii. *Worker grievances;*

xiii. *Community grievances*

l. *Traffic and vehicles/equipment:*

xiv. *traffic accidents involving project vehicles & equipment: provide date, location, damage, cause, follow-up;*

xv. *accidents involving non-project vehicles or property (also reported under immediate metrics): provide date, location, damage, cause, follow-up;*

xvi. *overall condition of vehicles/equipment (subjective judgment by environmentalist); non-routine repairs and maintenance needed to improve safety and/or environmental performance (to control smoke, etc.).*

m. *Environmental mitigations and issues (what has been done):*

xvii. *dust: number of working bowsers, number of waterings/day, number of complaints, warnings given by environmentalist, actions taken to resolve; highlights of quarry dust control (covers, sprays, operational status); % of rock/muram/spoil lorries with covers, actions taken for uncovered vehicles;*

xviii. *erosion control: controls implemented by location, status of water crossings, environmentalist inspections and results, actions taken to resolve issues, emergency repairs needed to control erosion/sedimentation;*

xix. *quarries, borrow areas, spoil areas, asphalt plants, batch plants: identify major activities undertaken this month at each, and highlights of environmental and social protection: land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation;*

xx. *blasting: number of blasts (and locations), status of implementation of blasting plan*

(including notices, evacuations, etc.), incidents of off-site damage or complaints (cross-reference other sections as needed);

xxi. spill cleanups, if any: material spilled, location, amount, actions taken, material disposal (report all spills that result in water or soil contamination);

xxii. waste management: types and quantities generated and managed, including amount taken offsite (and by whom) or reused/recycled/disposed on-site;

xxiii. details of tree plantings and other mitigations required undertaken this month;

xxiv. details of water and swamp protection mitigations required undertaken this month.

n. compliance:

xxv. compliance status for conditions of all relevant consents/permits, for the Work, including quarries, etc.): statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance;

xxvi. compliance status of ESMP/ESIP requirements: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance

xxvii. other unresolved issues from previous months related to environmental and social: continued violations, continued failure of equipment, continued lack of vehicle covers, spills not dealt with, continued compensation or blasting issues, etc. Cross-reference other sections as needed.

3. <u>Requirements for the preparation of the Code of Conduct</u>

The Concessionaire shall submit the Code of Conduct that will apply to the Concessionaire's employees and subcontractors. The Code of Conduct shall ensure compliance with the ESHS provisions of the Concession Agreement, including those as may be more fully described in the following:

a. Works Requirements described in Concession Agreement;

b. Environmental and Social Impact Assessment (ESIA);

c. Environmental Management Plan (EMP);

d. Consent Conditions (regulatory authority conditions attached to any permits or approvals for the project).

Minimum Requirements for the Code of Conduct

A minimum requirement for the Code of Conduct should be set out, taking into consideration the issues, impacts, and mitigation measures identified in:

- project reports e.g. ESIA/ESMP
- consent/permit conditions

- required standards including World Bank Group EHS Guidelines and Performance Standards
- national legal and/or regulatory requirements and standards (where these represent higher standards than the WBG EHS Guidelines and PS)
- relevant standards e.g. Workers‟ Accommodation: Process and Standards (Indian Standards, and in the absence of such Indian Standards those of IFC and EBRD)
- relevant sector standards e.g. workers accommodation
- grievances redress mechanisms.

The types of issues identified could include risks associated with: labor influx, spread of communicable diseases, sexual harassment, gender based violence, illicit behavior and crime, and maintaining a safe environment etc.

A satisfactory code of conduct will contain obligations on all project staff (including sub-contractors and day workers) that are suitable to address the following issues, as a minimum.
Compliance with applicable laws, rules, and regulations of the jurisdiction

1. Compliance with applicable health and safety requirements (including wearing prescribed personal protective equipment, preventing avoidable accidents and a duty to report conditions or practices that pose a safety hazard or threaten the environment)
2. The use of illegal substances
3. Non-Discrimination (for example on the basis of family status, ethnicity, race, gender, religion, language, marital status, birth, age, disability, or political conviction)
4. Interactions with community members (for example to convey an attitude of respect and non-discrimination)
5. Sexual harassment (for example to prohibit use of language or behavior, in particular towards women or children, that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate)
6. Violence or exploitation (for example the prohibition of the exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading or exploitative behavior)
7. Protection of children (including prohibitions against abuse, defilement, or otherwise unacceptable behavior with children, limiting interactions with children, and ensuring their safety in project areas)
8. Sanitation requirements (for example, to ensure workers use specified sanitary facilities provided by their employer and not open areas)
9. Avoidance of conflicts of interest (such that benefits, Concession Agreement, or employment, or any sort of preferential treatment or favors, are not provided to any person with whom there is a financial, family, or personal connection)
10. Respecting reasonable work instructions (including regarding environmental and social norms)
11. Protection and proper use of property (for example, to prohibit theft, carelessness or waste)
12. Duty to report violations of this Code
13. Non retaliation against workers who report violations of the Code, if that report is made in good faith.

The Code of Conduct should be written in plain language and signed by each worker to indicate that they have:

- received a copy of the code;
- had the code explained to them;
- acknowledged that adherence to this Code of Conduct is a condition of employment; and
- understood that violations of the Code can result in serious consequences, up to and including dismissal, or referral to legal authorities.

4. Guidelines for staffing of a Core team of 3 people for implementation of the Concessionaire's ESHS obligations

S.No	Key Position	Minimum Qualifying Requirement		
		Total Work Experience (years)	**Experience in Similar Works (years)**	**Minimum Education Qualification**
1.	Health Expert & Safety Specialist*	10	5	B.E. /B. Tech or Equivalent with Specialization / additional qualification in EHS related field.
2.	Environmental Specialist *	10	5	B.E./B. Tech or Equivalent with Specialization / additional qualification in Environment related field
3.	Social Specialist*	10	5	Master‟s degree in Social Work or equivalent

* He/she should have worked as a sole expert for Urban Infrastructure projects. Experience in environment / safety / Social Risk Assessment, resettlement and rehabilitation and Management plans related to similar projects would be preferred.

5. Minimum Requirements and Guidelines for the preparation of the Screening Report

The extent of assessment required to identify and mitigate the impacts largely depends upon the complexities of project activities. The scrutiny and screening will be based on a detailed Environment and Social Screening exercise, summarized in the following Format:

Environment and Social information format for screening			
	Project Title: Implementing agency: Project cost: Project components: Project location (Area/ district)		
	Screening Criteria	**Assessment of category (High/ low)**	**Explanatory note for**

			categorization
1	Is the project in an eco-sensitive area or adjoining an eco-sensitive area? (Yes/No) If Yes, which is the area? Elaborate impact accordingly.		
2	Will the project create significant/ limited/ no social impacts? ● Involuntary land taking resulting in loss of income from agricultural land, plantation or other existing land-use. ● Involuntary land taking resulting in relocation of title holder or non-titleholder households. ● Any reduction of access to traditional and river dependent communities (to river and areas where they earn for their primary or substantial livelihood). ● Any displacement or adverse impact on tribal settlement(s). ● Any specific gender issues.		
3	Will the project create significant / limited / no environmental impacts during the construction stage? (Significant / limited / no impacts) ● Clearance of vegetation/ tree-cover ● Direct discharge of construction run-off, improper storage and disposal of excavation spoils, wastes and other construction materials adversely affecting water quality and flow regimes. ● Flooding of adjacent areas ● Improper storage and handling of substances leading to contamination of soil and water ● Elevated noise and dust emission ● Disruption to traffic movements ● Damage to existing infrastructure, public utilities, amenities etc. ● Failure to restore temporary construction sites ● Possible conflicts with and/or disruption to local community ● Health risks due to unhygienic conditions at workers‟ camps ● Safety hazards during construction		
4	Will the project create significant / limited / no environmental impacts during the operational stage? (Significant / limited / no impacts) ● Flooding of adjacent areas ● Impacts to water quality due to effluent discharge ● Gas emissions ● Safety hazards		

5	Do projects of this nature / type require prior environmental clearance either from the MOEF&CC or from a relevant state Government department? (MOEF&CC/ relevant State Government department/ No clearance at all)		
6	Does the project involve any prior clearance from the MOEF&CC or State Forest department for either the conversion of forest land or for tree-cutting? (Yes/ No). If yes, which?		
7	Please attach photographs and location maps along with this completed Environmental Information Format For Screening.		
Overall assessment			

*Detailed explanation/ justification for arriving at specific category (high/ low) to be provided in the specified column

(Designation) (Designation)

(Address) (Address)

Environmental and Social Standards

Environmental Standards

a) The Concessionaire shall follow all the environmental standards for processing facility as per Solid Wastes Management Rules, 2016 and any amendments thereto till date. It shall also follow all those additional or stricter standards as defined in the Background Documents.

b) The Concessionaire shall meet the standards during the construction period as per the instruction or suggestion by the Independent Engineer from time to time based on the environmental standards applicable.

c) The Concessionaire shall meet the standards during the operation period as per the instruction or suggestion by the Appointed Agency/ Project Monitoring Agency from time to time as per the design requirement and applicable standards.

d) The Concessionaire shall form the Environmental Monitoring Cell (EMC) to review the effectiveness of the environment management system during the construction and operation phase of the Project Facilities. Independent Engineer shall be the Governing The AUTHORITY over the EMC functions.

e) EMC shall follow the schedule for monitoring as given in Background Documents and shall meet

regularly to review the effectiveness of the EMP (Environmental Monitoring Programme) implementation. The data collected on various EMP measures would be reviewed by EMC and if needed corrective action will be formulated for implementation purposes.

f) The Concessionaire through EMC shall coordinate all monitoring programmes at Project Site and data thus generated shall be regularly furnished to the state regulatory agencies. The Environmental Audit reports and review shall be prepared for the entire year of operations and shall be regularly submitted to regulatory authorities.

g) The Concessionaire shall set up a well-equipped laboratory for monitoring and analysis of environmental parameters for air quality, meteorology, water, wastewater, noise, groundwater, etc based on the overall monitoring requirement as given in Background Documents.

h) The Concessionaire shall follow the QA/QC procedures for all laboratory services and strive to get the certified laboratory status from quality point of view such as ISO 9000 and other similar standards. The overall goal should also be to acquire the status of certified and recognized laboratory under MOEF, Government of India. The Concessionaire shall strive to get ISO14001 certification for the entire facility.

i) The Concessionaire shall follow the environmental issues with management action along with responsibilities as mentioned in the following table.

Environmental Issues	**Management Action**	**Implementation Responsibilities**
Project Location		
Tree Clearance	▪ EMC will prepare a detailed Transplantation and Plantation plan and monitoring the implementation	Concessionaire
Energy Conservation Plan	▪ EMC will prepare a detailed Energy Conservation plan and monitoring the implementation	Concessionaire
Loss of local fauna	▪ EMC to create plan as per EIA report and implement the same	Concessionaire
Loss of trees & vegetation in the Project area	▪ EMC will prepare a detailed plantation plan and monitoring the implementation ▪ the AUTHORITY to closely oversee the work of trees and vegetation removal or plantation	The AUTHORITY / Concessionaire
Increase in the water requirement for domestic purpose	▪ EMC to monitor and prevent the excess water consumption	Concessionaire

Stress on the surrounding marine ecosystem	▪ EMC will plan the earth movement in consultation with the Concessionaire and see to it that the mitigation measures are implemented by the contractor/ operator	Concessionaire
Change in land use pattern	▪ Preparation the landscaping and greenery plan	Concessionaire
Loss of any archeological/ cultural /historic site	▪ The operator of the facility will be planned to eliminate any odour or ▪ pollution	Concessionaire

Processing/Implementation		
Air Pollution	▪ The EMC would look into the Action of the operator on regular basis	Concessionaire
High dust level	▪ The EMC would look into the action of the contractor on a regular basis ▪ the AUTHORITY through its monitoring agency can receive a feedback and direct the agency for corrective measures	The AUTHORITY /Concessionaire
Sediment runoff	▪ EMC will plan the excavation, etc in consultation with the contractor and see to it that the mitigation measures are Implemented by the contractor	Concessionaire
Safety of workers	▪ EMC to monitor and ensure the security and safety of workers	Concessionaire
Interference with the natural drainage of the local ecosystem	▪ Possible changes in natural drainage system to be avoided ▪ AUTHORITY to closely oversee any changes in natural drainage system	The AUTHORITY /Concessionaire
Flooding in other low lying areas	▪ EMC to monitor the construction and layout plan	Concessionaire

Noise Pollution	▪ Make provision in the contract to limit the noise pollution ▪ EMC will monitor noise ▪ Low noise vehicles with proper maintenance and monitoring	Concessionaire
Disposal of excavated material	▪ EMC to monitor the quantity and disposal	Concessionaire
Safety hazard during the erection and operation	▪ Regular monitoring and reporting	Concessionaire

Operation Phase		
Air pollution due to the MSW vehicles and processing plants	▪ EMC to ensure the air pollution of facility meets the norms ▪ Regular noise monitoring and reporting	Concessionaire
Increase in power consumption	▪ EMC will prepare a detailed Energy Conservation plan and monitor the implementation with The operator of the facility	Concessionaire
High air pollution along the various transport corridors leading to and away from The site	▪ EMC will monitor pollution and inspection log of vehicles	Concessionaire
Noise pollution due to the operational activities	▪ EMC to monitor noise and give feedback for control	Concessionaire
Noise pollution along the various transport corridors leading to and away from site	▪ EMC to monitor the noise pollution	Concessionaire
Solid waste management issues	▪ EMC to monitor and report	Concessionaire
Sewage/leachate treatment issues	▪ to maintain the STP as per the standard prescribed norms. ▪ EMC to monitor the same	Concessionaire

Periphery Development	▪ The AUTHORITY initiatives to be Communicated to Concessionaire for its implementation	Concessionaire

Social Standards

a) The Concessionaire shall provide a separate clinic at the Project Site where people can approach for primary health advice.

b) The Concessionaire shall provide community and training center within the Project Site wherein multiple employments related capacity building and training activities shall be undertaken and necessary skills shall be imparted.

c) The Concessionaire shall provide an employment opportunity based on training and skill assessment. The secondary employment and/or business opportunity shall be created through the facility operator or support services.

d) The Concessionaire shall provide training and awareness to laborers at the plant, which should be a continuous activity.

e) The Concessionaire shall set up MSW management and innovation center for every-one which will be useful to locals, students and others who would wish to work in this field.

f) The Concessionaire shall give prior importance to the nearby population to get involved in the activities of horticulture, garden maintenance, energy management, etc at the Project Facilities.

SCHEDULE 14 - TESTS

(See Article 14)

1. Schedule for Tests

1.1. For determining that the Construction Works conform to the Specifications and Standards, the Independent Engineer shall require the Concessionaire to carry out or cause to be carried out tests, at such time and frequency and in such manner as may be specified by the Independent Engineer from time to time, in accordance with Good Industry Practice for quality assurance.

1.2. In the event that results of any tests conducted, any defects or deficiencies in the Construction Works observed, the Concessionaire shall carry out remedial measures and furnish a report to the Independent Engineer on this behalf.

1.3. During the Construction Period, Independent Engineer to carry tests to determine whether the Construction is being carried out in conformance with the Construction Requirements given in the Schedules to this Agreement and whether the Construction Milestones of the Project have been achieved.

1.4. The Concessionaire shall notify the Authority/Independent Engineer of its readiness to subject the Project Facilities to Tests at any time after [7 (seven)] days from the date of such notice, and upon receipt of such notice, the Authority/Independent Engineer shall, in consultation with the Concessionaire, determine the date and time for each Test and notify the same to the Authority who may designate its representative to witness the Tests. The Authority/Independent Engineer shall thereupon conduct, or cause to be conducted, any of the following Tests in accordance with Article 14 and this Schedule.

1.5. The Concessionaire shall, no later than [90 (ninety)] days prior to the likely completion of the Construction Period, notify the Authority/Independent Engineer of its intent to subject the Project Facilities to Tests, and no later than [7 (seven)] days prior to the actual date of Tests, furnish to the Authority/Independent Engineer detailed inventory and particulars of all works and equipment forming part of the Project Facilities.

1.6. Before the civil construction starts, the Concessionaire shall need to follow the entire standard tests such as soil investigations, ground water levels, hydro-geological tests, concrete grades tests, etc.

1.7. The Concessionaire shall arrange the tests as per recommendations of the manufacturer of all electrical and mechanical machinery and equipment, and the test results shall be recorded in the presence of the Independent Engineer.

1.8. The Concessionaire shall arrange the tests of electrical equipment as per the requirement of the supply company and the test reports shall be

1.9. furnished to them to get the electric supply. Similarly, any test required to be carried out as per Supply Company requirements shall be carried out in presence of the Independent Engineer.

1.10. All tests in relation to the electrical equipment shall be conducted by the licensed electrical contractors only.

1.11. The relevant tests to be conducted shall be finalized by the Concessionaire in consultation with the Independent Engineer from time to time.

2. Tests

2.1. In pursuance of the provisions of Article 14.12.2 of this Agreement, the Authority/Independent Engineer shall conduct, or cause to be conducted.

2.2. Visual and Physical Test

The Authority/Independent Engineer shall conduct a visual and physical check of the Project Facilities, to determine that all works and equipment forming part thereof conform to the provisions of this Agreement.

2.3. Trial run

The Authority/Independent Engineer shall require the Concessionaire to carry out or cause to be carried out a trial run of all equipment, facilities and systems to determine that the Project Facilities are in conformity with the provisions of this Agreement.

2.4. Tests for equipment

The Authority/Independent Engineer shall conduct or cause to be conducted Tests, in accordance with Good Industry Practice, for determining the compliance of all systems and equipment comprising the Project Facilities.

3. Environmental audit:

The Authority/Independent Engineer shall carry out a check to determine conformity of the Project with the environmental requirements set forth in Applicable Laws and Applicable Permits.

4. Safety review:

The Authority/Independent Engineer shall carry out a safety audit of the Project to determine its compliance with the provisions of this Schedule and this Agreement.

5. Agency for Conducting Tests

All Tests set forth in this Schedule shall be conducted by the Authority/Independent Engineer or such other agency or person as it may specify in consultation with the Authority.

6. Inspection by the Authority/Independent Engineer

Upon successful completion of Tests, the Independent Engineer shall submit an Inspection Report in accordance with the provisions of Article 14.

SCHEDULE 15 - FORMAT FOR [MILESTONE] COMPLETION CERTIFICATE

(See Article 14)

To whom it may concern

In consideration of the requirements of conditions of the Agreement and the Concessionaire's application for a Completion Certificate, the Authority hereby grants the Completion Certificate.

This Completion Certificate is issued on the understanding that the conditions of the Agreement have been met except for minor outstanding work that does not affect the use and safety of the [Reclaimed Land/Project Facilities] and their intended use as certified by Authority through its letter dated [•].

Completion Certificate does not relieve the Concessionaire of any requirements or obligations within the Agreement.

Signed this …….. day of ……., 20 …… at ……...

AGREED, ACCEPTED AND SIGNED

SIGNED, SEALED AND DELIVERED

For and on behalf of	For and on behalf of
Concessionaire by:	Authority by:
(Signature)	(Signature)
(Name)	(Name)

COMPLETION CERTIFICATE

1 I,(Name of the Independent Engineer), acting as Independent Engineer, under and in accordance with the Concession Agreement dated.....(the Agreement ‖),for Integrated Solid Waste Management in [Place]on design, build, finance, operate and transfer (DBFOT) basis, through
.....(Name of Concessionaire), hereby certify
that the Tests specified in Article 16 and Schedule 7 of the Agreement have been successfully undertaken to determine compliance of the Project with the provisions of the Agreement, and I am satisfied that the Project can be safely and reliably placed in commercial service.

2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Project have been completed, and the Project is hereby declared fit for entry into commercial operation on this the ……
Day of…… 20…..

SIGNED, SEALED AND DELIVERED
For and on behalf of the INDEPENDENT ENGINEER by:

(Signature) (Name)(Designation)(Address)

PROVISIONAL CERTIFICATE

I/We ..... {Enter the name of the Independent Engineer} acting as Independent engineer, under and in accordance with the Concession Agreement dated ……. (the **"Agreement"**) for Implementation of ***"Integrated Waste Management for Jurisdiction of Bengaluru Urban District Area Under DBFOT Model (Design, Build, Finance and Operate and Transfer) for 30 Years*** ("the **"Project"**) through …… {insert the name of the Concessionaire}, hereby certify that verification and tests as specified in Article 4 and Scheduled 8 of the Agreement have been undertaken for the Project to determine compliance thereof with the provision of the Agreement.

All the works forming part of the Project of the Integrated Solid Waste Management, that were found to be incomplete and/or deficient have been specified in the Punch List appended hereto, and the Concessionaire has agreed and accepted that it shall complete and/or rectify all such works in the time and manner set forth in the Agreement. [Some of the incomplete works have been delayed as a result of reasons not attributable to the concessionaire or due to Force Majeure and the Provisional readiness Certificate cannot be withheld on this account. Though the remaining incomplete works have been delayed as a result of reasons attributable to the Concessionaire,][1] I/We am/are satisfied that having regard to the nature and extent of such complete works, it would not be prudent to withhold commercial operation of Regional Integrated Solid Waste Management Project pending for completion.

In view of the foregoing, I/we am/are satisfied that the operations or part thereof the Regional ***"Integrated Solid Waste Management for Bengaluru Urban District Area Under DBFO Model (Design, Build, Finance and Operate) for 30 Years***..... can be partially or fully started for delivery of services to the users thereof, and in-terms of the Agreement, the Regional Integrated Solid waste Management Project, ... is hereby provisionally declared fit to start the operations or the part thereof on this the .....day of …… 2022

ACCEPTED, SIGNED, SEALED AND DELIVERED
For and on behalf of CONCESSIONAIRE by:

(Signature)
(Name and Designation) Address

May be Struck out if not applicable. Also strike out other parts which are not applicable

ACCEPTED, SIGNED, SEALED AND DELIVERED
For and on behalf of INDEPENDENT ENGINEER by:
(Signature)
(Name and Designation) Address

SCHEDULE 16 - FORMAT FOR DAILY WEIGHT SHEET

(See Article 18)

The same may be altered to include additional items by the Authority at its discretion.

Weighbridge details	
Location	
Capacity	
Date	
Time in	
Time out	
Truck no.	
Tier weight (tons)	
Full weight (tons)	
Waste quantity (Full weight – tier weight)	

SCHEDULE 17 - ESCROW AGREEMENT

(See Article 19)

[This Agreement format is subject to change as per the discretion of the Authority]

THIS ESCROW AGREEMENT is entered into on this the……..day of 20….

AMONGST

(1) The [Name of the Authority], incorporated under the [Name of the Act under which incorporated], represented by its [Municipal Commissioner] and having its principal offices at ***, India (hereinafter referred to as the "**Authority**" which expression shall unless repugnant to the context or meaning thereof include its administrators, successors and assigns);

AND

(2) [Name of the Concessionaire], a company organized, incorporated, registered and existing under the Companies Act, with its registered office at [•] acting through [•], [Name of the authorised signatory and his/her designation] duly authorized by resolution dated [Date of the Board Resolution] (hereinafter referred to as the "**Concessionaire"**, which expression shall, unless it be repugnant to the context or meaning thereof, include its successors and permitted assigns)

AND

(4) [Name of Escrow Bank], a bank duly constituted in accordance with Applicable Laws and carrying on the business of banking in India as a Scheduled Commercial Bank, with its registered office at [•] and acting for the purposes of this Escrow Agreement through its branch office at [•] (hereinafter referred to as the "**Escrow Bank"**, which expression shall unless repugnant to the context or meaning thereof includes its successors and permitted assigns).

The Authority, the Concessionaire and the Escrow Bank are collectively referred to as **Parties** and individually as **Party**.

WHEREAS:

A. The Authority has decided to undertake the development and operation of an integrated solid waste management system and reclamation of land through bioremediation of legacy waste on a PPP basis, through a DBFOT model.

B. For this purpose, the Authority have entered into a Concession Agreement dated with the Concessionaire (the "**Concession Agreement**") for development and operation of integrated solid waste management system and reclamation of land through bioremediation of legacy waste on hybrid annuity basis at_____, in the State of [Name of the State], and a copy of which is annexed hereto and marked as Annex-A to form part of this Agreement.

C. In consideration of the Concessionaire designing, engineering, part-financing, procuring, constructing, installing, commissioning, operating and maintaining the Project on the Site(s) for the Concession Period, the Authority is required to pay the Concessionaire: (i) during the Construction Period, the Construction Payments upon satisfactory completion of works corresponding to Payment Milestones; and (ii) during the O&M Period, O&M Payments

comprising the Capex Annuity (along with interest), the O&M Charges and the Power Charges for the Project Facilities at actuals (subject to a cap based on the Guaranteed Energy Consumption).

D. As per the provisions of the Concession Agreement, the Authority, the State Government, the Concessionaire are required to enter into an escrow agreement with an escrow bank and is required to open an escrow account with such escrow bank and maintain the Minimum Escrow Balance for the payment of the Construction Payments and the O&M Payments.

E. The escrow account shall be funded by the Authority in accordance with the terms of this Escrow Agreement and such account shall serve to secure the Authority payment obligations towards the Concessionaire under the Concession Agreement.

F. The Escrow Bank is willing to serve as an escrow bank in accordance with the terms and conditions of this Escrow Agreement.

NOW, THEREFORE, the Parties hereto agree as follows:

1. DEFINITIONS AND INTERPRETATION

1.1. Capitalized terms used but not defined in this Escrow Agreement shall have the meaning given to them in the Concession Agreement.

1.2. In this Escrow Agreement, unless the context otherwise requires:

(a) Any reference to a statutory provision shall include such provision as modified or re-enacted or consolidated from time to time.

(b) The words importing the singular shall mean the plural and vice-versa; and words importing the masculine shall include the feminine and neuter and vice-versa.

(c) Headings in this Escrow Agreement are for convenience of reference only.

(d) The references to the word 'include' or 'including' or to the phrase 'in particular', shall be construed without limitation.

(e) References to any date or time of day are to Indian Standard Time; any reference to day shall mean a reference to a calendar day; any reference to a month shall mean a reference to a calendar month, any reference to a year shall mean a reference to a calendar year.

(f) The references to any agreement or deed or other instrument shall be construed as a reference to such agreement, deed, or other instrument as may be amended, varied, supplemented or novated, from time to time.

(g) Whenever provision is made for the giving or issuing of any notice, endorsement, consent, approval, permission, certificate or determination by any person, such notice, etc., shall be reasonably given, shall not be unreasonably withheld or delayed and shall be in writing. Where any notice, consent or approval is to be given by either of the Parties, the notice, consent or approval shall be given on their behalf only by any authorized persons.

(h) The words written and in writing include a facsimile transmission and any means of reproducing works in a tangible and permanently visible form.

(i) The provisions of the clauses of this Escrow Agreement shall be interpreted in such a manner that will ensure that there is no inconsistency in interpretation between the intent expressed in the clauses.

(j) In the event of any ambiguities or discrepancies between two clauses of this Escrow Agreement, the provisions of the specific clause relevant to the issue under consideration shall prevail over those in other clauses.

(k) The rule of construction, if any, that an agreement should be interpreted against the Party responsible for the drafting and preparation thereof shall not apply to this Escrow Agreement.

2. ESCROW ACCOUNT

2.1. Appointment

(a) The State Government, the Authority and the Concessionaire hereby appoint the Escrow Bank to serve as the escrow bank for the purposes of this Escrow Agreement and the Escrow Bank hereby accepts this appointment.

(b) The Authority hereby settled in trust with the Escrow Bank a sum of INR 1,000 (Rupees one thousand). The Escrow Bank has accepted the above amount of INR 1,000 (Rupees one thousand) in trust declared and, subject to the terms and conditions in this Escrow Agreement, agreed to act as trustee for the benefit of the Concessionaire and the Authority.

(c) The Escrow Bank shall hold and safeguard the Escrow Account and any monies held therein, during the term of this Escrow Agreement and shall treat the amount in the Escrow Account as monies deposited by the Authority with the Escrow Bank in trust in accordance with the provisions of this Escrow Agreement.

(d) In performing its functions and duties under this Escrow Agreement, the Escrow Bank shall act as an agent of the Authority and the Concessionaire.

2.2. Escrow Account

(a) The State Government has established a bank account in the name of **[●]** (*name of account and account number*), with **[●]** (*name of the bank*), which shall be an interest bearing, no lien account, denominated in Indian Rupees for the benefit of the Concessionaire (the "**Escrow Account"**).

(b) The Escrow Bank shall provide details of the Escrow Account in writing to the Concessionaire and the Authority, including the date of opening of the Escrow Account.

(c) The Parties agree and acknowledge that:

(i) the Escrow Account shall be opened pursuant to, and specifically for the purposes of, this Escrow Agreement and shall be used and operated only for the purposes and in the manner provided in this Escrow Agreement and for no other use or purposes and in no other manner;

(ii) the Escrow Bank shall maintain the Escrow Account in accordance with the terms of this Escrow Agreement and its usual practices and applicable regulations;

(iii) the Escrow Bank and the Concessionaire, after consultation with the Authority shall agree on the detailed mandates, terms and conditions and operating procedures for the Escrow Account but in the event of any inconsistency between this Escrow Agreement and such mandates, terms and conditions or procedures in this Escrow Agreement shall prevail; and

(iv) no instruction shall be given to the Escrow Bank which is not contemplated by or which is contrary to or inconsistent with this Escrow Agreement. In the event any such inconsistent or contrary instruction is given, the same shall be null and void and the Escrow Bank shall not be obliged to act upon, and shall ignore, such instructions and continue to comply with the provisions of this Escrow Agreement.

2.3. Deposits into Escrow Account

(a) Minimum Escrow Balance

At all times, to maintain the minimum balance in the Escrow Account (the **"Minimum Escrow Balance"**):

(i) State Government or the Authority shall deposit in the Escrow Account an amount equivalent to the

(ii) on and from the COD and during the O&M Period, the State Government or the Authority shall deposit the O&M Payments in the Escrow Account such that the Escrow Account is funded at all times, the amount equivalent to next [3 (three)] O&M Payments for the Project Facilities, in accordance with Article 18.1.6 of the Agreement,

(b) The Authority shall ensure that the minimum balance in the Escrow Account at all times during the Concession Period is not less than the Minimum Escrow Balance.

If at any time during the Construction Period or the O&M Period, the balance in the Escrow Account falls below the Minimum Escrow Balance, the State Government or the Authority shall promptly, and in any event, no later than 90 (ninety) days, fund the Escrow Account such that the Minimum Escrow Balance is maintained.

The Parties agree that a failure to maintain the Minimum Escrow Balance for 90 (ninety) days would be treated as an Authority Event of Default or State Government Event of Default and in such case, the consequences set out in the Concession Agreement shall apply.

(c) It is clarified that any interest earned on the amounts deposited by Authority in the Escrow Account will be counted towards the Minimum Escrow Balance.

2.4. Withdrawals from Escrow Account during the Construction Period

(a) Upon successful completion and verification of a Payment Milestone as per the

Concession Agreement, the Authority is required to approve the Invoice raised by the Concessionaire within 7 (ten) days of receipt of the Invoice and issue a Payment Certificate to the Escrow Bank. The Payment Certificate shall convey the Authority's approval for the release of the amount specified in the Invoice for the relevant Payment Milestone, less any necessary deductions or adjustments in accordance with the Concession Agreement and/or Applicable Laws (including for payments to be made by the Concessionaire under applicable labour laws).

(b) If, within 7 (seven) days from the date of receipt of an Invoice, the Authority does not dispute an Invoice, then the Invoice shall be deemed to have been accepted by the Authority, and the Concessionaire may issue instructions to the Escrow Bank (with a copy to the Authority) to release the amounts specified in the Invoice, upon the expiry of the 7 (seven) day period. Any such instruction issued by the Concessionaire to the Escrow Bank shall be accompanied with the Invoice raised by the Concessionaire for the relevant Payment Milestone.

(c) Immediately upon receipt of a Payment Certificate from the Authority in accordance with clause 2.4(a) above or upon receipt of instructions from the Concessionaire in accordance with clause 2.4(b), the Escrow Bank shall release the amount specified in the Payment Certificate or if no Payment Certificate has been issued, then the amount specified in the relevant Invoice to the bank account of the Concessionaire mentioned below :
Bank:
Account number: BIC (SWIFT):
Address of Bank:
[**Insert bank account details**]

The Concessionaire may change the above bank account details by giving a 5 (five) day prior written notice to the Escrow Bank, the Authority.

(d) Upon any termination of the Concession Agreement during the Construction Period of the Project Facilities, the State Government or the Authority shall issue instructions to the Escrow Bank requesting it to release and transfer any amounts due and payable to the Concessionaire, including termination payments, if any, as certified by the Authority and the State Government in a statement and any remaining amounts standing to the credit of the Escrow Account shall be transferred to the following account of the Authority/State Government:
Bank:
Account number: BIC (SWIFT):
Address of Bank:
[**Insert bank account details**]

The Authority may change the above bank account details by giving 5 (five) day prior written notice to all the Parties to this Escrow Agreement.

2.5. Withdrawals from Escrow Account during the O&M Period

(a) For O&M Payments in each [month/quarter], the Authority is required to approve the Invoice raised by the Concessionaire within 7 (seven) days of receipt of the Invoice and issue a Payment Certificate to the Escrow Bank. The Payment Certificate shall convey the Authority's approval for the release of the amount specified in the Invoice, less any

necessary deductions or adjustments in accordance with the Concession Agreement and/or Applicable Laws (including for payments to be made by the Concessionaire under applicable labour laws).

(b) If, within 7(seven) days from the date of receipt of an Invoice, the Authority does not dispute an Invoice, then the Invoice shall be deemed to have been accepted by the Authority, and the Concessionaire may issue instructions to the Escrow Bank (with a copy to the Authority to release the amounts specified in the Invoice, upon the expiry of the 7(seven) day period. Any such instruction issued by the Concessionaire to the Escrow Bank shall be accompanied with the Invoice raised by the Concessionaire.

(c) Immediately upon receipt of a Payment Certificate from the Authority in accordance with clause 2.5(a) above or upon receipt of instructions from the Concessionaire in accordance with clause 2.5(b), the Escrow Bank shall release the amount specified in the Payment Certificate, or if no Payment Certificate has been issued, then the amount specified in the relevant Invoice to the bank account of the Concessionaire mentioned below:
Bank:
Account number:
BIC (SWIFT):
Address of Bank:
[Insert bank account details]

The Concessionaire may change the above bank account details by giving a 5 (five) day prior written notice to the Escrow Bank, the Authority.

(d) Upon any termination of the Concession Agreement during the O&M Period, Authority shall issue instructions to the Escrow Bank requesting it to release and transfer any amounts due and payable to the Concessionaire, including termination payments, if any, as certified by Authority in a statement and any remaining amounts standing to the credit of the Escrow Account shall be transferred to the following account of Authority:
Bank:
Account number:
BIC (SWIFT):
Address of Bank:
[Insert bank account details]

The Authority may change the above bank account details by giving 5 (five) day prior written notice to all the Parties to this Escrow Agreement.

2.6. The Authority shall have the right, and the Concessionaire hereby expressly grants to the Authority the right, to recover the costs and Damages directly from the Escrow Account, and for that purpose, the Concessionaire hereby agrees to give irrevocable instructions to the Escrow Bank to make payment from the Escrow Account in accordance with the instructions of the State Government or the Authority. Any demand from the State Government or the Authority stating that a specified amount is payable shall be final, binding and conclusive on the Concessionaire and Escrow Bank and Escrow Bank shall pay and Concessionaire shall cause the Escrow Bank to pay such amount without any demur, delay, cavil or protest on receiving a demand for such costs and Damages.

2.7. Identification and Separation

The Escrow Bank shall clearly identify in its records the Escrow Account as an escrow account and shall keep the funds standing to the credit of the Escrow Account separated and segregated from the Escrow Bank's own funds or funds of any of its other customers or third parties.

2.8. Fees

The State Government shall pay [Rs. [•] per annum] as fees to the Escrow Bank for the establishment and management of the Escrow Account. The State Government shall pay such fees to the Escrow Bank within 10 (ten) days of receipt of an invoice from the Escrow Bank.

2.9. Escrow Account Statements

The Escrow Bank shall provide monthly statements regarding the Escrow Account to the State Government, the Authority and the Concessionaire.

3. ESCROW AMOUNT

3.1. Promptly upon the State Government or the Authority transferring any amount to the Escrow Account, the Escrow Bank shall send a notice to the Concessionaire, the Authority notice informing them of the transfer.

3.2. The Escrow Bank shall hold all amounts in the Escrow for the benefit of both the Concessionaire, the Authority. Subject to clause 2.4(d) and clause 2.5(d) of this Escrow Agreement, the Escrow Bank shall not release any amount in the Escrow Account to any person other than the Concessionaire.

3.3. The Escrow Bank shall not apply any right of set-off against the amount in the Escrow Account, grant any lien over such amount, or apply any fee or deduction in relation to such amount.

4. RIGHTS, DUTIES AND OBLIGATIONS OF THE ESCROW BANK

4.1. The Escrow Bank

(a) may, in the absence of bad faith, fraud, willful default or gross negligence on its part, rely as to any matters of fact which might reasonably be expected to be within the knowledge of the Authority, as the case may be, upon a certificate signed by or on behalf of the Authority, as the case may be;

(b) may, in the absence of bad faith, fraud, willful default or gross negligence on its part, rely upon the authenticity of any communication or documents believed by it to be authentic;

(c) shall, within 5 (five) days after receipt, deliver a copy to the Authority of any notice or document received by the Escrow Bank from the Concessionaire or any other Person hereunder or in connection herewith;

(d) shall, within 5 (five) days after receipt, deliver a copy to the Concessionaire of any notice or document received by the Escrow Bank from the State Government or the Authority in connection herewith; and

(e) shall maintain all records of deposits and withdrawals from the Escrow Account for the term of this Escrow Agreement.

4.2. The duties of the Escrow Bank are only as herein specifically provided, and are purely

administrative in nature. The Escrow Bank shall neither be liable for, nor chargeable with knowledge of, the terms and conditions of any other agreement, instrument or document in connection herewith, including, without limitation, the Concession Agreement, and shall be required to act in respect of the amounts in the Escrow Account only as provided in this Escrow Agreement. This Escrow Agreement sets out all the obligations of the Escrow Bank with respect to any and all matters pertinent to the Escrow Account contemplated hereunder and no additional obligations of the Escrow Bank shall be implied from the terms of any other agreement. The Escrow Bank shall incur no liability in connection with the discharge of its obligations under this Escrow Agreement or in connection therewith, except such liability as may arise from the Escrow Bank's negligence, willful misconduct or otherwise from any breach of this Escrow Agreement. Such liability, however, shall not exceed the amount in the Escrow Account at the date of the said breach by the Escrow Bank.

4.3. The Escrow Bank shall not be required to perform any act which will violate any Applicable Laws.

4.4. In the event of any bankruptcy proceedings or enforcement proceedings against any of the Parties pursuant to Applicable Laws, the Escrow Bank shall, notwithstanding the provisions of this Escrow Agreement, act and perform in accordance with Applicable Laws.

5. ESCROW AGREEMENT DEFAULTS

5.1. The following events shall constitute an event of default by the Concessionaire (an **Escrow Default**), unless such event of default has occurred as a result of any act or omission of the State Government or the Authority:

(a) in case the Concessionaire diverts funds drawn from the Escrow Account for a project/activity/usage other than the Project, and fails to cure such breach by not depositing an equal amount in the Escrow Account within 5 (five) days; or

(b) in the case of any other breach, by failing to remedy the breach within 5 (five) days to the satisfaction of the Authority.

5.2. The Parties agree that an Escrow Default in terms of this Escrow Agreement shall be treated as a Concessionaire Event of Default under the Concession Agreement, and the consequences of an Escrow Default shall be dealt with in accordance with the Concession Agreement.

5.3. Upon the occurrence of an Escrow Default, the Concessionaire agrees that the Authority shall have the right to direct the Escrow Bank to suspend withdrawals from the Escrow Account until further notice from the State Government or the Authority.

6. MISCELLANEOUS

6.1. Representations and Warranties

Each Party represents and warrants that:

(a) it has the authority to enter into this Escrow Agreement;

(b) this Escrow Agreement constitutes a legally valid and binding obligation, enforceable

against it in accordance with its terms;

(c) its entry into and/or performance under this Escrow Agreement will not be in breach of any express or implied terms of any contract with or other obligation to any third party; and

(d) it is solvent and able to perform all of its obligations under this Escrow Agreement.

6.2. Notices

Any notice or other communication to be given or made under this Escrow Agreement to the Parties shall be in writing. Except as otherwise provided in this Escrow Agreement, such notice, request or other communication shall be delivered by registered mail or facsimile to the Party(ies) at the following addresses:

[State Department of Urban Development]:

Attention: ---____-_____-_____-
Tel:
Fax:
Address:

Email:

[Name of the Authority]:

Attention: ---____-_____-_____-
Tel:
Fax:
Address:
Email:

[Concessionaire]:

Attention: ---____-_____-_____-
Tel:
Fax:
Address:
Email:

[Escrow Bank]:

Attention: ---____-_____-_____-
Tel:
Fax:
Address:
Email:

6.3. Entire Agreement

This Escrow Agreement and the Concession Agreement constitutes the entire agreement and understanding between the Parties with respect to its subject matter (i.e., escrow arrangement), and replaces and supersedes all prior agreements, arrangements, undertakings or statements regarding such subject matter.

6.4. Amendments

No variation of or amendment to this Escrow Agreement shall be effective unless made in writing and executed by all the Parties hereto.

6.5. Harmonious Construction

For the purpose of giving full and proper effect to this Escrow Agreement, the Concession Agreement and this Escrow Agreement shall be read together and construed harmoniously. The terms of the Concession Agreement shall prevail in the event of any inconsistencies with this Escrow Agreement.

6.6. Assignment

Neither this Escrow Agreement nor any of the rights or obligations hereunder may be assigned by a Party without the prior written consent of the other Parties, provided that the Concessionaire shall be entitled, to the extent permitted by Applicable Law and as may be required under any Financing Documents entered into by the Concessionaire, to assign or create liens over its rights and interests under or pursuant to this Escrow Agreement.

6.7. Severability

Whenever possible, each provision of this Escrow Agreement shall be interpreted in such a way as to be effective and valid under Applicable Law, but if any provision of this Escrow Agreement is unenforceable or invalid under Applicable Law, such provision shall be ineffective only to the extent of such unenforceability or invalidity, and the remaining provisions of this Escrow Agreement shall continue to be binding and in full force and effect.

6.8. Confidentiality

The Parties, their employees, representatives and agents shall keep the provisions of this Escrow Agreement strictly confidential and, except as may be required by Applicable Laws, shall make no disclosure thereof to any Person, except the Parties' respective legal counsels and professional advisers, without the prior written consent of the other Parties.

6.9. Termination

This Escrow Agreement shall be automatically terminated upon the expiry of the Concession Period or termination of the Concession Agreement and after disbursement of all amounts due and payable to the Concessionaire under the Concession Agreement, including Termination Compensation, if any, and any remaining amounts to the State Government or the Authority in accordance with clause 2.4(d) and clause 2.5(d) of this Escrow Agreement.

6.10. Dispute Resolution Mechanism

(a) If any dispute arises out of or in connection with this Escrow Agreement, this dispute shall not affect the Parties' duty to continue the performance of all of their undisputed

obligations.

(b) If any dispute arises, a Party shall give notice to the other Parties of the same, whereupon the Parties shall meet promptly and in good faith to attempt to reach an amicable settlement.

(c) All disputes not settled amicably pursuant to (b) above shall be heard by the competent courts of [State of Project].

6.11. Governing Law

This Escrow Agreement shall be governed by and construed in accordance with the laws of India.

IN WITNESS WHEREOF THE PARTIES HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

THE COMMON SEAL OF THE CONCESSIONAIRE has been affixed pursuant to the resolution passed by the Board of Directors of the Concessionaire at its meeting held on the …… day of 20…… hereunto affixed in the presence of……, Director, who has signed these presents in token thereof and ……, Company Secretary / Authorised Officer who has countersigned the same in token thereof [33:]

SIGNED, SEALED AND DELIVERED
For and on behalf of STATE GOVERNMENT by the
State Government Representative:

(Signature) (Name) (Designation) (Address) (Fax No.)
(E-mail address)

SIGNED, SEALED AND DELIVERED
For and on behalf of AUTHORITY by the
State Government Representative:

[33]To be affixed in accordance with the articles of association of the Concessionaire.

(Signature) (Name) (Designation) (Address) (Fax No.)
(E-mail address)

SIGNED, SEALED AND DELIVERED
For and on behalf of ESCROW BANK by the
State Government Representative:

(Signature) (Name) (Designation) (Address) (Fax No.)
(E-mail address)

In the presence of:

1. 2.

SCHEDULE 18 - TERMINATION COMPENSATION
[DELETED]

SCHEDULE 19 - CRITERIA FOR PREPARING THE LIST OF CHARTERED ACCOUNTANT FIRMS

(See Article 30.2)

The Firm of Chartered Accountants (FCA):

1. Should be in operation for the past 10 (ten)years
2. Should not have been barred or blacklisted by any entity like Central, State Government Body or Public Sector Undertaking PSU (Central/State) or any other Statutory Body.
3. Should have a branch in [Name of the State]
4. Should have at least 3 (three) qualified Chartered Accountants out of whom at least 1 (one) should be FCA.

SCHEDULE 20 – DESCRIPTION OF SITE AND DISPOSAL FACILITY

Sl. No	Name of Site/ Proposed Project Facility	Status of Dumping site/ Trenching ground/ Landfill	Total Area Available (In Acres)
1			
2			
3			
4			

Description of Site for Integrated Processing & Disposal Facility

The size of the proposed site for development of regional landfill site would be around _____Hectares.

SCHEDULE 21 – PERFORMANCE SECURITY

[This format is subject to change as per the discretion of the Authority]

The Commissioner, AUTHORITY WHEREAS:

1 (the**—Concessionaire**‖) the**—BSWML** ‖have entered into a Concession Agreement dated (the **—Agreement**‖) whereby the AUTHORITY has agreed to the Concessionaire undertaking Integrated Solid Waste Management at [*Place*] on design, build, finance, operate and transfer (**—DBFOT**‖)basis, subject to and in accordance with the provisions of the Agreement.

2 The Agreement requires the Concessionaire to furnish a Construction Performance Security to the AUTHORITY, for an amount of INR.___(the **—Guarantee Amount**‖) as security for due and faithful performance of its obligations, under and in accordance with the Agreement, during the Construction Period (as defined in the Agreement).

3 We,……..through our Branch at (the**—Bank**‖) have agreed to furnish these Bank Guarantees by way of Construction Performance Security.

NOW, THEREFORE, the Bank hereby, unconditionally, and irrevocably, guar antes and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Concessionaire‘s obligations during the Construction Period, under and in accordance with the Agreement, and agrees and undertakes to pay to the AUTHORITY, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Concessionaire, such sum or sums up to an aggregate sum of the Guarantee Amount as the AUTHORITY shall claim, without the AUTHORITY being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.
2. A letter from the AUTHORITY, under the hand of the Municipal Commissioner, the AUTHORITY that the Concessionaire has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the AUTHORITY shall be the sole judge as to whether the Concessionaire is in default in due and faithful performance of its obligations during the Construction Period under the Agreement and its decision that the Concessionaire is in default shall be final, and binding on the Bank, notwithstanding any differences between the AUTHORITY and the Concessionaire, or any dispute between them pending before any court, tribunal, arbitrators or any other AUTHORITY or body, or by the discharge of the Concessionaire for any reason whatsoever.

3. In order to give effect to this Guarantee, the AUTHORITY shall been titled to act as if the Bank were the principal debtor and any change in the constitution of the Concessionaire and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the AUTHORITY to

proceed against the Concessionaire before presenting to the Bank its demand under this Guarantee.

5. The AUTHORITY shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfilment and/ or performance of all or any of the obligations of the Concessionaire contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the AUTHORITY against the Concessionaire, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the AUTHORITY, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the AUTHORITY of the liberty with reference to the matters aforesaid or by reason of time being given to the Concessionaire or any other forbearance, indulgence, act or omission on the part of the AUTHORITY or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the AUTHORITY in respect of or relating to the Agreement or for the fulfilment, compliance and/or performance of all or any of the obligations of the Concessionaire under the Agreement.

7. Not withstanding anything contained herein before, the liability of the Bank under this Guarantee will remain in force until compliance of the conditions specified in Paragraph 8 below and unless a demand or claim in writing is made by the AUTHORITY on the Bank under this Guarantee, no later than 6 (six) months from the date of expiry of this Guarantee, all rights of the AUTHORITY under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Performance Security will be valid till _____.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the AUTHORITY in writing and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred Branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered indue course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the AUTHORITY that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remain in force sand effect for a period specified in Paragraph 8 above.

Signed and sealed this…….day of……..,20……at……..

SIGNED, SEALED AND s DELIVERED

For and on behalf of the Bank by

(Signature)

(Name)(Designation)(Code

Number) (Address)

NOTES:

i. The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee

ii. The address, telephone number and other details of the Head Office of the Bank as well as of issuing Branch should be mentioned on the covering letter of issuing Branch.

SECTION 1 : GENERAL SPECIFICATIONS

1. General Guidelines

The minimum facilities to be provided in the Integrated Processing & Disposal Facility and Facilities which are to be implemented by the Concessionaire as part of the Project have been highlighted in this Schedule.

The Integrated Solid Waste Processing & Disposal Facility shall conform to the minimum design requirements set out in this Schedule and to the ISW Management & Handling Rules, 2016.

The net area available for development of Integrated Solid Waste Processing & Disposal Facility including waste processing units is about ____Hectare land shall be allotted in _____whereas the **Bengaluru Solid Waste Management Limited (BSWML)** of facilities as described in Schedule 1. The area utilization for development of the project facilities, as specified in this schedule, shall be as per the Applicable Laws, Good Industry Practices and in accordance with the construction requirements as set out hereunder.

All design and works have to be conducted in such a manner so that Integrated Solid Waste Processing & Disposal Facility has a service life of minimum Thirty (30) years w.e.f COD Integrated Solid Waste Processing & Disposal Facility. Further, the Concessionaire shall provide the design of the proposed system with the material balance of the waste and a flow chart describing the complete process and capacity of each component with the justification of its adequacy to be able to handle the generated waste of the project area during the entire project life and get it approved by the Independent Engineer (IE) and the Authority before commencement of project construction.

The Concessionaire shall follow general guidelines of the building design including energy conservation methods, an aesthetic look and vertical design to minimize ground coverage for architecture of the proposed facility.

The Concessionaire shall take over the site proposed as per the CPCB guideline and SWM rules to be used for development of the Integrated Solid Waste Processing & Disposal Facility for the project; and build a secure boundary wall, Good motorable road to site will be provided by BSWML and internal roads (as required); establish inspection areas; a waste receiving area; a material recovery/ segregation Facility; a waste treatment/ processing system with appropriate controls; a scientific landfill for disposal of rejects/inert (including all allied facility like leachate treatment & management facility), a digester for dead animals, storm-water management, infrastructure required for providing utilities such as electricity, water from the Integrated Solid Waste Processing & Disposal Facility periphery to within the Integrated Solid Waste Processing & Disposal Facility and other facilities such as weigh bridge and other buildings as per the proposed & accepted Design. Further, the Concessionaire shall provide a temporary arrangement, as identified by the Concessionaire in the DPR prepared during the Planning Phase, for handling the waste during the Interim Phase.

2. INTEGRATED SOLID WASTE PROCESSING & DISPOSAL FACILITIES

A). The Integrated Processing & Disposal Facility infrastructure has been divided into four parts:

i. Common infrastructure for the processing facility and landfill;
ii. Material Recovery Facility, if required;
iii. Waste processing facility;
iv. Scientific Landfill;

The complete facility infrastructure development, along with design and specifications of all components, shall be included in the DPR prepared by the Concessionaire during the Planning Phase and should be approved by the Independent Engineer (IE) and the Authority. The complete facility infrastructure development should include the following at a minimum (as per the proposal submitted and accepted by the Authority).

I. Common Infrastructure:

a. Boundary Wall for The Facilities: The Concessionaire shall construct a Pre-cast boundary wall of chain linked fencing of 800 mm height over 2100 ht mm height brick wall along the perimeter of the Integrated Processing & Disposal Facility and Facilities.

b. Green Belt: The Concessionaire shall provide a vegetative cover in a strip of minimum width 3 m all along the boundary wall at Integrated Processing & Disposal Facility and Facilities. as per MSW rules and statutory norms

c. Access Roads and Internal Roads: The Concessionaire **shall construct the quality black top, motorable access roads of approximately 300m length and 7-meter width** to the Integrated Processing & Disposal Facility and of 5. Approach road will ask **Bengaluru Solid Waste Management Limited (BSWML)** to provide up to the Integrated Solid Waste Processing & Disposal Facility and Internal roads will be under developed scope with 5.5 wide roads width within the Site, of required length, as per the IRC codes. The internal roads at Facilities shall also conform to the same norms.

d. Weigh Bridge: The Concessionaire shall provide one weigh bridge at the entrance of the Integrated Solid Waste Processing & Disposal Facility and another for weighing of waste being disposed in the Sanitary landfill site, of rated capacity of at least 50 MT capacity - 2 non metric ton each in the Integrated Solid Waste Processing & Disposal Facility, and shall meet the minimum technical specifications set out in Schedule 4. One weighbridge shall be provided at the Facilities in ……

e. Administration Building: The Concessionaire shall construct an Administration building consisting of office space for managers and other office staff in accordance with Good Industry Practice at Integrated Solid Waste Processing & Disposal Facility. It shall also have the basic amenities for workers and visitors including washroom, kitchen, and change room. The area of the administration building has to be appropriate for the purpose foreseen. All of the facilities and spaces in the building shall be suitably equipped with appropriate working gadgets, furniture, storages, communication, lighting etc. for its functional use.

f. Laboratory: The Concessionaire shall provide a quality control laboratory at Integrated Solid Waste Processing & Disposal Facility with the equipment adequate to carry out the following tests**:** Integrated Solid Waste analysis and characterization Leachate quality as per Schedule IV of SWM Rules. Compost/RDF/Biogas quality as per Schedule IV of SWM Rules Air quality as per Schedule IV of SWM Rules. Maturity Test for the Residual Inert Matter.

g. Water Supply Arrangements: The Concessionaire with the assistance of Authority shall arrange for a water supply system adequate to meet the requirements for Processing of ISW, drinking and washing purposes in accordance with Good Industry Practice. The Concessionaire shall bear the complete cost of the necessary infrastructure to be created within Integrated Solid Waste Processing & Disposal Facility periphery to the locations of intended use.

h. Power Supply Arrangements: The Concessionaire with the assistance of Authority shall arrange for a power supply system adequate to meet the electricity requirements for the facility including the requirements of the admin block, lab, street light, lab, and vehicle washing area, operations of all plant & machinery of the facility, in accordance with Good Industry Practice. The Concessionaire shall bear the complete cost of the necessary infrastructure to be created from the Integrated Solid Waste Processing & Disposal Facility periphery to the locations of intended use.

The Concessionaire shall further provide power back-up to ensure operation of at least the weighbridge, lighting of work area, leachate treatment plant and circulation system and Water supply system.

i. Lighting: The Concessionaire shall provide, in the integrated Solid Waste processing & disposal facility area & all the Facilities: Adequate lighting system to achieve a minimum lux level of 20 for the

working area; Street lighting with permanent street light posts for main internal roads and access roads; Movable heavy-duty focus lamps depending on the operational requirement.

j. Other Electrical Works: The Concessionaire shall provide all electrical equipment and implement all electrical works in the Waste Processing Facilities in accordance with Good Industry Practices. Quality of final products depending upon the ISW treatment technology proposed.

k. Storm Water Drainage System: The Concessionaire shall design and implement the storm water drainage system within the Waste Processing Facilities in such a manner as to ensure that:

- It is independent from the Leachate System;
- The run-off rain water from the hinterland does not enter the Integrated Solid Waste storage and processing area;
- There is no stagnation of rain water in the Site;
- Storm Water from surrounding high lying areas does not enter in to the site premises.

l. Leachate Management System: Concessionaire shall construct a leachate management system including leachate collection network and a storage tank in the Integrated Solid Waste Processing & Disposal Facility, if required. The system should be designed in a manner so that there is a possibility of leachate recirculation to the maximum possible extent. For the remaining leachate, a suitably designed treatment unit should be provided before its final disposal for green belt development and excess water will discharged into nearest water body or drains, ensuring that the quality of water in the nearest water body as well as the groundwater is not deteriorated further to that determined in the baseline testing. The overall design of the leachate system shall be such as to ensure that there is no percolation of the leachate into the ground and raw leachate does not come into contact with any water body without treatment.

m. Fire and Safety Equipment: All facilities would be provided with adequate arrangements for fire and safety equipment.

n. Waste Tipping and Segregation Area: For the receipt, inspection and segregation of ISW, the Concessionaire shall provide a separate area in Integrated Solid Waste Processing & Disposal Facility.

o. Waste Recovery & Segregation Facility: The Concessionaire shall build a material recovery facility to facilitate segregation of ISW for recovery of the recyclables at Integrated Solid Waste Processing & Disposal Facility. The segregation system could be both manual and mechanical, and may comprise of conveyors, star screens / Ballistics Separators / Trommel Screens and Magnetic Separators, etc.

p. Signage: All signage and signaling will be unambiguous and ensure safe traffic conditions within the Integrated solid waste Processing & Disposal Facility and Facilities. The Concessionaire will be responsible for the procurement and installation of any additional Solid Waste permanent or temporary signage required for the safe and effective operation of the Integrated Processing & Disposal Facility before commencement of his operations. Such signage will ensure that the O&M Team, the Authority and visitors are adequately advised in relation to: Traffic management; Parking, Health and safety issues; Operational procedures; Operational activities; Identification of principal elements of infrastructure; and Speed limits. All signs shall satisfy the requirements of the Applicable Laws.

q. Waste to Energy Processing Unit.

The Concessionaire is free to choose any technology/technologies and operational methodology for management of ISW in compliance with SWM Rules, 2016 and also meeting the norms of emissions and design requirements of the project. Further, the technology adopted for integrated solid waste processing shall be a proven & feasible technology for the waste of project area and shall be in accordance with the waste characteristics determined and analyzed based on the physical and chemical studies to be conducted by Concessionaire during the DPR preparation in the Planning Phase. The organic content of the waste has to be treated using appropriate biological processes or any other processes which meets the SWM Rules, 2016, including any statutory Amendments / modifications thereto for re-enactments thereof, for the time

being in force.

The facility for the Integrated Solid Waste processing is to be designed in a manner so that it is able to take variable input up to more than 10% of the designed handling capacity. Also, the Concessionaire should design a robust system that would be operational for 365 days in a year with no breakdown of more than three days. The technology process & its end products shall be in accordance with the accepted relevant standards/rules/regulation of Govt. of India and Govt. of Karnataka including but not limited to standards for air, water, leachate treatment, compost etc.

r. Scientific Landfill

The rejects/inert generated during the processing operations need to be disposed of in a scientific manner in the landfills using liners and covers to minimize exposure of the landfill contents to the environment. Design parameters for landfill the landfill construction shall be undertaken as per the design and plan as included in the DPR prepared by the Concessionaire during the Planning Phase, and as approved by the Independent Engineer. The Concessionaire shall develop the landfill for disposal of Residual Inert Matter and Other Inerts, amounting to not more than 25% of the received ISW quantity (by weight) at Integrated Solid Waste Processing & Disposal Facility, with a minimum project life of 30 years i.e. the COD Integrated Solid Waste Processing & Disposal Facility. The design of the landfill, including its layout, depth, height, side-slopes etc. shall be based on the results of geotechnical investigations and topographical surveys carried out during the Planning Phase by the Concessionaire. Further, the construction of the landfill has to be done completely in a single phase at the initiation of the project. The average quantity of MSW inert/rejects to be landfilled shall be estimated depending upon the input quantity of waste coming to the facility per day for the current as well as projected population of the Project Area.

s. Infrastructure for the Interim Phase: -

Further, the Concessionaire shall fence the area within the Integrated Solid Waste Processing & Disposal Facility for collecting the waste during the Interim Phase and handling it by providing a temporary arrangement, as identified by the Concessionaire in the DPR prepared during the Planning Phase. The waste collected during the Interim Phase shall comprise of; Total accumulated waste at various places in the project area which has to be assessed by the bidder dumped in the participating AUTHORITY's.

The amount of waste in each of the above categories has to be further assessed in the DPR prepared by the Concessionaire during the Planning Phase. This waste shall be disposed of in the scientifically designed landfill, hereby referred to as Landfill for Interim Phase, and closed, in accordance with.

SWM Rules 2016, A portion of the fenced area should be used for the receiving and temporarily storing the above mentioned waste till the Landfill for Interim Phase is ready. The technical requirements for this small landfill - Landfill for Interim Phase, should meet the technical requirements for the landfill facility mentioned in **Section 2 of Schedule 2.**

3. Overall Construction Requirements

a. Survey: -

The Concessionaire shall undertake a detailed topographic survey of the site at 5m grids (such levels being designated as "Natural Ground Level"). The Concessionaire to make boreholes or to carry out exploratory excavation for the Project design. The Concessionaire should submit the results of the surveys as a part of the DPR prepared by the Concessionaire during the Planning Phase.

b. Civil Works: -

The requirements of civil works for the waste processing facility shall be in accordance with the results of the field investigations. The engineering design and structural details of entire civil works of the processing facility including cover shed, tipping platform, foundation of the machinery & equipment, storage godown etc. shall be based on the geo-technical investigation, soil investigation tests & Contour mapping of the site, and shall be included in the DPR prepared by the Concessionaire during the Planning Phase. All design,

works and operations shall be in accordance to a "General Quality Standard" that means a standard of performance which, is competent, efficient, economical and in accordance with internationally accepted techniques used in the waste disposal industry; is in accordance with professional engineering, accounting and consulting standards, as applicable, recognized by international professional bodies; is in accordance with sound management, commercial, technical, design and engineering practices; employs appropriate technology and safe, effective equipment, machinery and methods; protects the interests of the Authorities; is in accordance with the Municipal Solid Waste (Management and Handling) Rules, 2000/ 2016.

c. Codes and Standards: -

The following standards shall be adopted:

- All applicable rules, regulations, acts, guidelines, standards and laws of Government of India and the State Government
- All applicable Indian Standards (IS)
- All applicable standards by the Bureau of Indian Standard(BIS) 9.1.2.4. All norms of the Indian Road Congress (IRC)
- All norms of the National Building Code (NBC)
- SWMRules,2016
- Environment (Protection)Act,1986
- Environment (Protection)Rules,1986
- EIANotification,2006 and amendments
- Guidelines and recommendation of Central Public Health & Environmental Engineering Organisation (CPHEEO), MoUD, GoI
- Electricity Rules,2005
- Electricity Act, 2003
- Guidelines of the State Electricity Regulatory Commission 9.1.2.14. All applicable norms of the Central Electricity Authority(CEA)
- All applicable rules, regulations, acts, guidelines, standards of Central Pollution Control Board (CPCB) and State Pollution

4. Procedure:

A. Before Commencement of Construction

I. Prior to commencement of any construction activity, the Concessionaire shall finalize an implementation plan for the DIP ("Detailed Investment Plan – project implementation and operation and management plan) as part of the DPR to be prepared during the Planning Phase. The DIP shall, inter alia, include:
   i. A detailed schedule of implementation for putting up and operationalizing the Project Facilities, which shall cover all stages/ aspects of implementation including design and engineering, procurement of materials and equipment, installation, construction and testing.
   ii. Manpower deployment plan, including the designation of key personnel for the management and supervision of all Project-related activities.
   iii. A broad method statement for key items (including earth works, concrete works, structural concrete work, and road works) setting out the methodology of construction, materials and construction equipment mobilization/ utilization plans.
   iv. Quality assurance plan.
   v. An operations and maintenance plan for the Project Facilities during the O&M Period (O&M Plan) and which shall, inter alia, include an Environmental Management Plan.
   vi. Format of the Monthly Project Progress Report giving details of the physical progress in implementation of the Project Facilities and operations and maintenance activities undertaken ("Monthly Project Progress Report").

II. Prior to commencement of construction of any of the Project Facilities, the Concessionaire shall have:

   i. Obtained all such Applicable Permits as are necessary to commence construction of such Project Facilities;

ii. Finalized such Drawings as are necessary and the Implementation Schedule with approval of the Independent Engineer;

iii. Mobilized the requisite resources, personnel and organization necessary for the same and designated and appointed suitable officers/representatives as it may deem appropriate with responsibility to supervise implementation of the Project and for exchange of information with the Independent Engineer and Authority;

iv. Finalized in consultation with the Independent Engineer a method statement setting out details of the actual methods that would be adopted by the Concessionaire for the construction of such Project Facilities including details of equipment and machinery that would be used, their locations, and arrangements for conveying and handling materials;

B. During Construction

The Concessionaire shall:

i. Ensure that the construction of the Project Facilities is undertaken with minimal inconvenience to the traffic using the existing access road to the Sites.

ii. Take precautions to avoid inconvenience to, damage to, destruction of or disturbance to any third-party rights and properties.

iii. Ensure adequate safety of the personnel deployed at the Sites which would include measures such as the provision and maintenance of barricades, and illumination during night in consultation with the IE.

iv. Be in compliance with the Applicable Laws and Applicable Permits obtained for the Project including the clearances obtained by SMC.

v. Adhere to the DPR during the Implementation Period.

C. Positions and Levels

The Concessionaire shall be responsible for:

a) The accurate setting-out survey control points, lines and levels of reference,

b) The correctness of the positions, levels, dimensions and alignment of all

D. Tests

I. Various tests ("Tests") would be undertaken for the Project as per the standards prescribed under SWM Rules and Bureau of Indian Standards. Where no testing methods are specified by the said standards, details of the Tests to be carried out and specifications to be achieved for the respective Project Facilities / Construction Works or part thereof shall be agreed upon with the IE prior to commencement of construction.

II. Where material properties vary from or comply only marginally with the specifications contained in the Construction Requirements, the IE shall increase the frequency of Testing as appropriate at the cost of the Concessionaire.

III. The Tests would be carried out at a location (place of manufacture, fabrication or preparation, at site or any specialized testing laboratory) that the IE may reasonably require, at the cost and expense of the Concessionaire.

IV. The Concessionaire shall provide such assistance, labour, electricity, fuels, stores, apparatus and instruments as are normally required for examining, measuring and testing any materials or plant and shall supply samples of materials, as required by the Independent Engineer to undertake Tests.

V. No part of the construction works shall be covered up or put out of view before the same has been examined by the IE. Substitution/ replacement of such improper material, equipment, machinery or plant.

VI. The Concessionaire shall mobilize quality equipment, plants and machinery to ensure adherence to the DPR.

VII. Concessionaire shall arrange for all the material requirements for the Project and disposal of all material wastes. The Applicable Permits in this regard would have to be obtained by the Concessionaire. All operations shall be carried out by the Concessionaire with minimum degradation of the environment. All

excessive and unsuitable excavated materials shall be stacked at appropriate dumping places or otherwise disposed of by the Concessionaire in consultation with the IE.

E. After Completion of Construction

Upon completion of construction but prior to issue of the Completion Certificate, the Sites shall be cleared of all construction equipment, surplus materials, debris and temporary installations and shall be left in tidy and clean manner and to the satisfaction of the IE, who shall further make recommendations to the Authority for approval.

SECTION 2: TECHNICAL SPECIFICATIONS: -

Landfill Components: -

1. The landfill site shall have the specifications as discussed in the following sub section.

i. Bottom Liner:

A composite bottom liner system consisting of drainage layer, HDPE layer and compacted clay shall be provided as per CPCB/SPCB Guidelines & SWM Rules, 2016.

- A 90cm thick compacted clay or amended soil (amended with bentonite) as per IS: 6186-1986 Specification to reach the permeability not greater than $1X10^{-7}$ cm/sec.
- A Minimum 1.5 mm thick Grade I smooth HDPE liner as per IS: 10889-1984 Specification for High Density Polyethylene Films
- A drainage layer of 300 mm thick granular material of permeability not greater than 10^{-2} cm/sec.

Alternatively, Concessionaire may use Geo-Synthetic Clay Layer (GCL) in place of compacted clay, to avoid utilization of valuable clay, with approval from the Independent Engineer. Also the Concessionaire may use Geo-composite Drainage Layer in place of 300 mm thick granular material, with approval from Independent Engineer.

ii. Intermediate Liner System: -

The Concessionaire shall, in accordance with the O&M Requirements, provide an Intermediate Liner, which shall consist of a 600 mm thick soil.

iii. Protected Layer/Amended Soil (in bottom liner and top cover): -

A layer of amended soil shall be part of the impervious layer and shall be located below the HDPE layer. Amended soil shall be prepared from soil available within the premises, however if soil availability do not satisfy the requisite quantity, it may be imported from nearby area by means of transport or the available soil may be mixed with medium to high plasticity imported clay, or commercial clays such as bentonite, to achieve the required low hydraulic conductivity. Soil- bentonite admixtures are commonly used as low permeability amended soil.

Soil with the following specifications would prove to be suitable for liner construction:

a. Percentage Fines – between 40 and 50% (IS : 2720 Part IV)
b. Placidity Index – between 10 and 30% (IS 2720 – part V)
c. Liquid Limit – 25 to 30% (IS 2720 – part
d. Clay content – 18 to 25%

The sequence of laying the amended soil over the waste layer shall be as following:

a. Excavate waste if necessary and then level and compact the waste layer.
b. Spread Clay in thin layers of specified thickness (loose) Spread Bentonite powder if necessary.

c. Mix Bentonite powder with tractor mounted plough and dish arrangement by repeated movement of tractor.

The amended soil layer shall meet the following criteria:

a. Hydraulic conductivity of $k<10^{-7}$ cm/sec or Specified thickness.
b. Absence of shrinkage cracks due to desiccation.
c. Absence of clods in the compacted clay layer.
d. Adequate strength for stability of liner under compressive loads as well as alongside slopes Minimal influence of leachate/waste on hydraulic conductivity.

Testing:

Compaction Test (standard proctor, and modified proctor or equivalent) for host material as well as imported soil as per IS: 2720, and Permeability Test of compacted soil after saturation (for host material as well as imported soil) as per ASTM: D 5084 or Olson and Daniel (1979).

The compact amended soil layer shall be subjected to following characteristics of the sample:

a. Mechanical Analysis or grain size analysis as per IS: 2720 Part IV
b. Liquid Limit as per IS: 2720 Part V
c. Plasticity Limit as per IS: 2720 Part V.
d. Moisture Density Relationship as per IS : 2720
e. Permeability Test as per IS: 2720.

iv. Drainage layer: -

- The drainage layer shall be made up of granular soil of permeability coefficient (k) greater than 10^{-2} cm/sec. The size of material to be used shall be 25 mm and fraction content of material size less than 25 mm should not be more than 5%. Clean coarse sand is the preferred material for this layer; however, gravel may also be used.

Testing:

The quality control test for drainage layer shall include test for grain size and permeability by following test method:

Parameter	**Test Method**
● Grain Size	IS 2720 (Part 4)
● Permeability	IS 2720 (Part 17)

The test results shall meet the material specifications to be used in the drainage layer.

Geo Composite Drainage Layer:

The drainage layer shall consist of drainage composite of specified thickness for drainage purpose. The geo-composite shall basically be a drainage net made from polyethylene material in which the geonet shall be sandwiched between geo-textile. The geo- composite shall comply with the following minimum specifications and must be laid after approval from the Independent Engineer.

Sl. No.	**Specifications**	**Test Method**	**Unit**	**Accepted Value**
1	Material			PE
2	Filter Separator			Non-Woven

3	Physical Property of Composite (General)			Thermally bounded geotextile on each side of the core.
4	Mass Per Unit Area	EN ISO 9864	g/m^2	650
5	Thickness	EN ISO 9863 – I	mm	5
6	Roll Width		M	3
7	Roll Length		M	50
8	Filter Overlap (one side)		mm	100

Landfill Gas Management System:

The Concessionaire shall provide a suitable landfill gas management system, approved by the IE. The system shall be designed according to the landfill gas generation estimate from the landfill, whether active or passive, as per the CPCB guidelines & SWM Rules, 2016.

v. Daily Soil Cover and Final Cover: -

The Concessionaire shall, in accordance with the O&M Requirements, at its own cost and expense provide the Daily Soil Cover which shall consist of a 150 mm thick.

The Concessionaire shall, in accordance with the O&M Requirements, provide the Final Cover which shall be in accordance with the CPCB guidelines & SWM Rules, 2016, depending upon the proposed landfill gas management system, whether active or passive system.

Soil Requirement:

The top layer of the landfill shall be made up from top soil of specified thickness. The soil for this layer shall be transported from approved borrow pits suitable for growing vegetation and developing landscaping. The topsoil shall consist of natural, friable soil that shall be fertile soils capable of producing heavy growth of plants. The plant to be planted on the topsoil shall have fibrous root system like grass, marigold, lilies, daffodils, tulip, cannas lily etc. The top soil transported to the project site shall be reasonably free from underlying subsoil, clay lumps, objectionable weeds, litter, matted roots, toxic substances or any material that might be harmful to vegetative growth or be a hindrance to grading, planting, or maintenance operations. Top soil shall also meet the following specifications:

Parameter	**Test Frequency**	**Accepted value**
Max. Particle size (mm)	Per $1,500m^3$	25
pH	Per $1,500m^3$	5-7
Organic Content (%)	Per $4,000m^3$	5-20

Testing of Topsoil:
Testing of topsoil shall be performed on representative samples of each principal type or combination of topsoil material. At least one set of tests shall be performed on each borrow source proposed. A minimum of 2 kg of top soil from each proposed borrow source shall be sent to the designated laboratory. Testing shall consist of the

determination of maximum particle size in accordance with ASTM D 422, pH in accordance with ASTM D 4972 and organic content in accordance with ASTM D 2974. No topsoil shall be placed until the borrow source assessment report is approved. The report shall include the location of each source, estimated quantity of borrow available, logs of subsurface exploration and laboratory test results.

Topsoil Placement:
Top soil shall not be placed when the base is excessively wet, extremely dry, or in a condition otherwise detrimental to proper grading. Topsoil shall be placed in one lift and shall be evenly spread to a final compacted thickness of desired thickness. Topsoil shall be traffic compacted or as specified by IE using approved placement equipment. On slopes, topsoil shall be placed from bottom of the slope upward.

Protection and Stockpiling of TopSoil:
Erosion rills or other damage that occurs during construction shall be repaired and grades re- established. Repairs to the select topsoil layer shall be documented including location and volume of soil layer affected, corrective action taken, and results of retests. Storage or stockpiling of material on the completed surface of the topsoil layers shall not be permitted.

2. The HDPE Liner used in different layers should have the following technical specifications.

i. Smooth HDPE Liner (In bottom liner and top cover): -
The lining material shall be of highest quality high-density polyethylene (HDPE) sheeting, manufactured in using virgin high-density polyethylene resin entirely free of plasticisers or other filler materials.

Only 10% of the resin may be from edge cut-offs. The HDPE sheet shall be manufactured through Flat Cast extrusion technology and shall have minimum length of 150 m and minimum width of 7 m per roll to reduce the no of welding/seaming points. The liner material shall be supplied with a 125mm-film sheet along the roll longitudinal edges in order to keep this zone clean and to stop oxidation.

This film shall be removed immediately before welding. The overlapping and welding area shall be marked with a white line to assure an optimum welding. The welding area on the outside edge of the liner shall be smooth. The thickness of the HDPE Geo-membrane shall not vary across the roll by more than 5%.

Properties of Smooth Geomembrane:

Description		**Test Method**	**Unit**	**Minimum Value**	**Frequency of Test**
Thickness Nominal		ASTM D 5199	Mm	1.50 (should not vary across the roll by more than 5%)	Every Roll
Density		ASTM D 1505	gm/cc	0.94	Every 5th role
Melt Flow Index (recommended in GRI Standards)		ASTMD 1238 (190°C – 2.16 kg)	Gm/10 min	≤ 1.0	
Tensile Strength at Yield (recommended as per GRI standards)		ASTM D 6693	kN/m	24	Every 5th roll
Tensile Strength at break		ASTM D 6693	N/mm	42	Every 5th roll
Elongation at Yield		ASTM D 6693	%	15	Every 5th roll

Elongation at Break		ASTM D 6693	%	≥700	Every 5th roll
Tear Resistance		ASTM D 1004	N	200	Every 5th roll
Puncture Resistance		ASTM D 4833	N	480	Every 5th roll
Low temp Brittleness (optional)		UNE EN-495	-	No Cracks (optional criteria)	
Carbon Black Content		ASTM D 1603	%	2 - 3 %	Every 5th roll
Carbon Black Dispersion		ASTM D 5596		Cat 1-2	Every 5th roll
Cold Belding at –20 °C (optional)		ASTM D 2136	-	Passed (optional criteria)	Every 5th role
NCTL		ASTM D 5397	Hrs.	>300	
Environmental Stress Crack Resistance – (ESRC Test.)		DIN 16726	Hrs.	NR	Every 5th role

The immediate surface to be lined so that it is free of irregularities, protrusion, vegetation, excessive water, loose soil or abrupt changes in grade. The supporting surfaces do not necessarily contain stones or other matter of such composition shape or size which may be damaging to the HPDE and there are no excessively soft surface areas.

ii. Installation of HDPE: -

Deployment equipment shall be such that it does not damage the subgrade; personnel who are in contact with the liner shall be strictly prohibited from smoking, wearing damaging shoes, or engaging in other activities that damages the liner.

A low ground pressure, rubber tired all-terrain vehicle will be used on the HDPE surface, proper care will be taken to avoid damage and excessive traffic.

Field panel replacement installation sequence would be taken into account site drainage, wind direction, sub-grade surface and access to the site and production schedule of the project. HDPE panel deployment will not proceed when adverse weather conditions exist which may jeopardize the integrity of the liner installations. Field Panel would be seemed as soon as possible after deployment and all deployed materials will be marked with proper identification.

a. Visual inspection: -

The designated IE shall visually inspect each panel as soon as possible after deployment for damage or areas needed repair. Areas shall be marked for repair wherever necessary.

b. Anchoring: -

Anchoring trenches shall be prepared by the Earth work by concessionaire as per the drawing, lines width and dimension. The task will be deployed prior to HDPE deployment. Edges where the HDPE enters the trench shall be free from irregularities, protrusions etc. for avoiding damages.

Back filling will occur when the HDPE material is at its most contracted state to avoid potential bridging. Problems utmost care would be taken to avoid damaging the HDPE during the backfilling.

Procedures specified by the manufacturer would be followed for seaming of HDPE liners. Every HDPE seam should be tested over 100% of its length, any time a seaming operation begins, a sample would be cut for testing, a sample also would be taken any time a seaming operation is significantly modified.

c. Trial Seams (Trial Welds): -

Prior to production seaming, trial seams shall be made and only then accepted using project specific criteria. Trial seams shall be made on appropriate sized pieces of identical or equivalent HDPE material to verify that seaming conditions and procedures are adequate. Each trial seam sample shall be assigned a number and the test results recorded in appropriate log.

Trial seams will be performed for each welder to be used and by each operator of the extrusion welder, and by the primary operator for each fusion welder. A Passing trial seam shall be made prior to the beginning of each streaming period.

Fusion welding trial seam samples would be done approximately 6 feet long by one-foot-wide with the seam centered lengthwise. For extrusion welders the trial seam sample size shall be approximately 4 feet long by 1-foot-wide with the seam centered lengthwise.

Four specimens, each one-inch-wide with six-inch-long shall be cut from the trial seam using a coupon cutter. Two of the specimens shall be tested for shear and two of the specimens to be tested for peel on a field tensiometer. When testing a fusion-welded seam, both inside and outside seams shall be tested. All shear and peel test specimens will meet or exceed the project requirements.

d. Panel Seams (Production Seaming) :

Upon acceptance of the trial seams, work will be begun on deployed panes. All seams shall be non-destructively and destructively tested. Each completed seam shall be labelled with pertinent information.

e. Non-Destructive seam testing: -

The purpose of the Non-Destructive test is to demonstrate leak resistance of the seam.
Non - destructive testing shall be conducted either by Air Pressure Test or Vacuumed Test. All nondestructive tests shall be in consultation with the Independent Engineer.

f. **Vacuum Testing: -**

The equipment for vacuum testing consists of a vacuum box assembly with a vacuum gauge, a pumping device and a soap solution. Vacuum testing shall be carried out in the following method; Section of seam made wet with soap solution. The seam section must be longer than the vacuum box. Place the vacuum box over the wetted area and apply body weight to form a seal between the gasket and the liner.
Evacuate air to create a negative pressure of 5 psi. Observe the seam through the viewing window for the presence of soap bubbles emitting from the seam. If no bubbles are observed, reposition the box on the next wetted area for testing with a slight overlap. If bubbles are detected which indicates a peak in the seam, mark the area of leak for repair and retest.

g. Air Pressure Testing: -

Air pressure testing shall be accomplished with a double seam testing apparatus. Equipment for the testing shall include - an Air Pump, or air tank, capable of producing a minimum air pressure of 30 Psig in seam channel, a Sharp hollow needle to insert air into the air channel of the seam, a hot air gun or other heating device to seal the ends of the air channel.

Following Procedure to be followed to conduct the test: Seal both sides of the air Chamber. Insert the needle into the air chamber at either end of the steam to be tested. Pressurize the air channel to a minimum of 30 psig. Allow the pressure to stabilize and if necessary, re- pressurize to 30 psig and note the pressure. With a minimum pressure of 30 psig stabilized in the air channel, the time of the day shall be noted. After approximately 5 min. The air pressure should be read again. In case a difference between the two readings are more than 4 psig the seam needs to be retested.

Upon completion of the test and recording all information required, open the opposite end of the seam from the needle. Escaping air will confirm that the entire length of the seam was pressurized and therefore tested. If the air does not escape, the channel is blocked. The blockage is then located and tested redone from the point. Upon completion of the air pressure test, the seam will be marked and points requiring repair identified.

In case the Air Pressure Test Fails, following procedures shall be followed: Reposition the apparatus and reset the same section. While the seam air channel is under pressure, traverse the length of the seam and listen to the leak. While the seam air channel is under pressure, apply a soapy solution – observe for bubbles formed by escaping air. Re-test the seam in progressively smaller increments, until the area of leakage is identified. Repair identified leakage area by extrusion welding the excess material at the edge of the seam and then vacuum test. In areas where the air channel is closed and the integrity of the weld is not suspect, vacuum testing is acceptable.

h. Destructive Seaming Testing: -

Destructive seaming tests shall be performed at selected locations. The purpose is to evaluate bonded seam strength. Seam Strength testing shall be performed as work progresses. The frequency of sample removal is commonly no more than one sample per 500 liner feet of the seam. A sample segment twelve inches by twelve inches shall be cut with the seam centered lengthwise. Additional segments may be cut for independent lab testing, archival retain or other uses.

i. Testing: -

Sample shall be tested in peel and in shear using the followed methods:

- Ten Specimens of 1 inch width shall be cut with a coupon cutter from the segments with a machine press and die.
- Five specimens shall be tested for peel. Fusion welds shall be tested from both sides.
- Five specimens shall be tested for shear.

SCHEDULE 22 – O&M PERFORMANCE SECURITY

Performance Security for Operation and Maintenance Requirement

[This format is subject to change as per the discretion of the Authority]

The Commissioner, AUTHORITY, WHEREAS:

1 (the**—Concessionaire**‖)and the**—the AUTHORITY**‖) have entered into a Concession Agreement dated …….. (the **—Agreement**‖)where by The AUTHORITY has agreed to the Concessionaire undertaking Integrated Solid Waste Management at *[Place]* on design, build, finance, operate and transfer(**—DBFOT**‖) basis, subject to and in accordance with the provisions of the Agreement.

2 The Agreement requires the Concessionaire to furnish an Operation Performance Security to the AUTHORITY, the cumulative amount of which is INR ……..(the**—Guarantee Amount**‖) as security for due and faithful performance of its obligations, under and in accordance with the Agreement, during the Operation Period (as defined in the Agreement).

3 We,……..through our Branch at.....(the**—Bank**‖) have agreed to furnish this Bank Guarantees by way of Operation Performance Security.

NOW, THEREFORE, the Bank here by, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Concessionaire‘s obligations during the Operation Period, under and in accordance with the Agreement, and agrees and undertakes to pay to the AUTHORITY, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Concessionaire, such sum or sums up to an aggregate sum of the Guarantee Amount as the AUTHORITY shall claim, without the AUTHORITY being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the AUTHORITY, under the hand of the Municipal Commissioner, the AUTHORITY that the Concessionaire has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the AUTHORITY shall be the sole judge as to whether the Concessionaire is in default in due and faithful performance of its obligations during the Construction Period under the Agreement and its decision that the Concessionaire is in default shall be final, and binding on the Bank, notwithstanding any differences between the AUTHORITY and the Concessionaire, or any dispute between them pending before any court, tribunal, arbitrators or any other AUTHORITY or body, or by the discharge of the Concessionaire for any reason whatsoever.

3. In order to give effect to this Guarantee, the AUTHORITY shall been titled to act as if the Bank were the principal debtor and any change in the constitution of the Concessionaire and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the AUTHORITY to proceed against the Concessionaire before presenting to the Bank its demand under this Guarantee.

5. The AUTHORITY shall have the liberty, without affecting in any manner the liability of the Bank

under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfilment and/ or performance of all or any of the obligations of the Concessionaire contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the AUTHORITY against the Concessionaire, and either to enforce or for bear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the AUTHORITY, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the AUTHORITY of the liberty with reference to the matters aforesaid or by reason of time being given to the Concessionaire or any other forbearance, indulgence, act or omission on the part of the AUTHORITY or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the AUTHORITY in respect of or relating to the Agreement or for the fulfilment, compliance and/or performance of all or any of the obligations of the Concessionaire under the Agreement.

7. Not withstanding anything contained herein before, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force in compliance of the conditions specified in Paragraph 8 below and unless a demand or claim in writing is made by the AUTHORITY on the Bank under this Guarantee, no later than 6 (six) months from the date of expiry of this Guarantee, all rights of the AUTHORITY under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Operation Performance Security will be valid from the Scheduled COD till one year after the expiry of the Concession Period.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the AUTHORITY in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred Branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when It ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the AUTHORITY that the envelope was so posted shall be conclusive.

11. This Guarantee shall remain in force till the period mentioned in Paragraph above.

Signed and sealed this…….days of……..,20……at……..

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by

(Signature)

(Name)(Designation)

(Code Number)

(Address)

NOTES:

i. The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee

ii. The address, telephone number and other details of the Head Office of the Bank as well as of issuing Branch should be mentioned on the covering letter of issuing Branch.

O&M Scope & Requirements: -

The Concessionaire will prepare and maintain up-to-date a copy of the Operations and Maintenance Manual (O&M Manual) – Standard Operating Procedure (SOP) covering all aspects of provisioning O&M of movable and immovable infrastructure associated with this Project as per the SWM Rule 2016. This O&M Manual should be specified as a part of the DPR to be prepared by the Concessionaire during the Planning Phase.

The Concessionaire will be responsible for the operation and maintenance of Integrated Solid Waste Processing & Disposal Facility, including equipment and vehicles as well as the infrastructure.

Operations & Maintenance Manual and Plans

The Concessionaire shall finalise the O&M Plan and the O&M Manual for the Project in the manner as set out below:

Prior to making application for the Readiness Certificate for the Project the Concessionaire shall finalise in consultation with the Independent Engineer:

a) The O&M Manual (including the formats for the reports to be submitted during the Operations Period and the Post Closure Period)

b) The O&M Plan for the first five years of operations and shall be modified for subsequent years

c) If applicable, the month-on-month maintenance schedule for each module of Waste to Energy plants for the first five years of the Concession Period.

Six weeks prior to the anniversary of COD each year, the Concessionaire shall submit to the Independent Engineer and The AUTHORITY an annual O&M Plan for the next year of operations.

General Requirements

Installation of Closed-Circuit Television Cameras

The Concessionaire shall install a closed-circuit television camera at Processing Facility Input and Output Weighbridges to record the vehicles being weighed. The camera shall record clearly the registration details of the vehicle and face of the vehicle driver along with time. At the end of each day, a back-up copy of the closed- circuit television camera recording of the day shall be produced on compact disc(CD).

Weighing of Vehicles at the Processing Facility –All incoming and outgoing vehicles to the Processing Facility shall be weighed, inspected and cleaned regularly.

Maintenance of Structures

(a) The CC, RCC, Masonry, Steel and other structures with the Processing Facility shall be reported to the Independent Engineer and shall be maintained in good conditions.

(b) The CC, RCC, Masonry and other structures shall be checked for cracks and other deformations and shall be attended immediately

(c) Periodic maintenance including plastering, cementing, painting, etc. shall be done for CC, RCC, Masonry and other structures periodically (atleast once in two years)

(d) Periodic maintenance including welding, riveting, painting, etc. shall be done for steel structures periodically (atleast once in two years)

Maintenance of Utilities and Services

The utilities and services like water supply, wastewater collection and treatment, lighting, green belt, etc. within the Processing facility shall be attended immediately for any repairs and shall be maintained in good conditions.

Maintain Hygienic and Aesthetic Conditions

The MRF Processing Facility shall be maintained in hygienic and aesthetic conditions by taking proper measures as suggested by the Independent Engineer.

Hazardous Waste Disposal

The Concessionaire shall dispose of the Hazardous Waste generated by the processing units of MSW and/or any other waste such as batteries, used oil in machineries, etc, under the Hazardous Waste (Management and Handling) Rules, 1989.

Cleaning and Maintenance Requirements

The Concessionaire shall plan and execute cleaning and maintenance procedures ensuring, that

a) The buildings, structures, seeded and planted areas, paved and un- paved traffic areas etc. are

maintained clean and proper without damages that may impede their functionality or appearance.

b) All moving or fixed equipment and machinery are maintained clean and in good working condition.

c) All service facilities, e.g. outdoor sewage system, leachate management system, etc., are inspected regularly, cleaned and maintained.

d) Every day at closing time the internal roads and other paved areas shall be inspected, and any spillage of MSW shall be collected and disposed properly..

Monitoring Procedures

The monitoring at integrated facilities shall be carried out during implementation/ Construction Period, Operation Period and Post Closure Period. The monitoring plan shall be prepared in accordance with the applicable State Pollution control Board requirements and as described in the Background Documents.

Management of Labour and Prevention of Accidents

The Concessionaire shall comply with all the provisions of the laws regarding deployment of labour under the contract; the Abolition of Contract Labour Act, the Minimum Wages Act, The Workmen's Compensation Act and the provisions of the MSW Rules 2016.

It shall be the liability and responsibility of the Concessionaire to implement the provisions of these acts. In addition to;

(a) The Concessionaire shall not employ in connection with the work any person who has not completed 18 years of age.
(b) The Concessionaire shall furnish to the AUTHORITY; information on the various categories of labour employed by him and the facilities given to the employees in the form prescribed for the purpose at such intervals as may be specified in the work specification.
(c) The Concessionaire shall keep all records desired under the said labour laws and submit periodical returns to the respective statutory authorities.
(d) The Concessionaire shall in respect of labour employed by him comply with provisions of the various labour Laws and the Rules and Regulations as applicable to them in regards to matters provided therein and shall indemnify AUTHORITY in respect of all claims that may be raised against AUTHORITY for non-compliance thereof by the Concessionaire.

The Concessionaire shall report and register all occurrences of;

(a) Accidents involving risks for human health and security;
(b) Other incidents connected with occupational health and security; and
(c) Unscheduled interruptions to the planned operations including fires, explosions, break- down of vehicles, break-down of essential machinery & equipment, etc.

The reports shall be forwarded to the AUTHORITY & relevant authorities. The registered

information shall be kept in the "Report Book". The accident and other incident record formats and record keeping procedure shall be approved by the AUTHORITY.

Facilities and Benefits for the WorkForce Employed

The Concessionaire shall furnish the details of the workforce employed for the work defined in this document – details of the workers including those for supervision before commencing the work.

Each person (including Supervisor) deployed on this work shall be provided the following facilities.

(a) Uniform with ID approved by the AUTHORITY (visible distinctly at night)
(b) Safety and protective gears

Training, Social Programmes and Public Grievances

(a) Fortnightly/Monthly public awareness program details to be provided to the AUTHORITY by the Concessionaire one month prior to such program throughout the Concession Period

(b) The Concessionaire shall provide community and training center within the Project Site wherein multiple employments related capacity building and training activities shall be undertaken and necessary skills shall be imparted.

(c) The Concessionaire shall provide an employment opportunity based on training and skill assessment. The secondary employment and/or business opportunity shall be created through the facility operator or support services.

(d) The Concessionaire shall provide training and awareness to labours at the plant, which should be a continuous activity and maintain the records.

(e) The Concessionaire shall set up MSW management and innovation center for every-one which will be useful to locals, students and others who would wish to work in this field.

(f) The Concessionaire shall give prior importance to the nearby population to get involved in the activities of horticulture, garden maintenance, energy management, etc at the Project Facilities.

(g) The Concessionaire shall involve the NGOs, Govt. organizations, representative of local gram panchayats, Dist. Collector Officers, etc in consultation with the AUTHORITY for training and public awareness programs.

(h) The Concessionaire shall maintain health records of all the artisans and labour staff. The health record formats and record keeping procedure shall be approved by AUTHORITY/concerned medical representatives.

(i) The Concessionaire should create a system to register public grievances and redressal system.

Operational Plan

(To be submitted by the Concessionaire) The operational plans should include the following key points:

a) Secondary Collection and Transportation
- Transportation of waste from transfer stations to processing facilities as per Scope of Work.
- Machineries/equipment operational plan
- Maintenance of Transfer stations

a) Processing Facility
- Number of processing lines and their operational plan for MRF
- Number of processing lines and their operational plan for processing (Waste to Energy, Waste to BioCNG, etc.) along with planned capacity, efficiency, output, etc.
- Machineries/equipment operational plan
- Routine and break down maintenance plan

b) Environmental Management Plans
- Monitoring plan
- Quick response mechanism
- Maintenance plan for plantation and greenbelt
- Health and safety plan
- Pollution control units and their operational plan

c) Disaster Management Plan

d) Month-on-month maintenance schedule of Waste-to-Energy plants, other processing units, if applicable

Environment Monitoring: -

The Concessionaire will be wholly responsible for proper planning and management of waste generated within the project area. The Concessionaire shall make an annual Operational Plan of various activities/facilities, following the Technical Specifications set out in this document as a part of the O&M Manual. The Operational Plan for various activities/facilities for the Interim Phase and 1st year of operation post COD Integrated Solid Waste Processing & Disposal Facility shall be submitted as a part of the DPR to be made by the Concessionaire during the Planning Phase. The Concessionaire shall further submit the Operational Plan annually, along with periodically (once a quarter) updates, if any, throughout the Concession Period in line with Good Industry Practice and Applicable Laws & Applicable Permits and get it approved by the IE and MC. The Concessionaire shall also submit monthly progress reports to the IE and MC detailing progress in implementing the Annual Operation Plan, problems encountered and remedial actions taken and any deviation from the plan during the period. Further, the Concessionaire shall further, provide an O&M Team of qualified professionals for the operations and maintenance of the mandated activities. The team shall also be responsible for ensuring the maintaining the quality as well as the environmental systems. The O&M Team shall comprise of, but not limited to, a project manager, a civil engineer, an environmental/quality engineer and an account manager.

The Concessionaire shall also devise a schedule, as a part of O&M Manual, of regular maintenance for all plant and equipment to ensure the Facilities continued optimum performance and program the need for any downtime of the Integrated Solid Waste Processing & Disposal Facility such that disruption to the Integrated Solid Waste Processing

& Disposal Facility shall be minimized. In any event, the Concessionaire will be obliged to make any unscheduled repairs at the earliest opportunity.

O&M of Equipment and vehicles as well as the infrastructure created at Integrated Solid Waste Processing & Disposal Facility & its Facilities.

i. General Obligations: -

The Concessionaire will manage, operate and maintain all onsite plant and ancillary equipment that support the operations of the Integrated Solid Waste Processing & Disposal Facility including but not limited to:

1. Weighbridge and registration system
2. Waste receipt and storage
3. Material Recovery System Recyclable storage
4. Waste processing – compost/incineration/ gasification/Anaerobic Digestion, whichever proposed, and rejects management,
5. Landfill operations
6. Fire Fighting Arrangements
7. Water and fire-fighting equipment;
8. Waste to Energy (if any), power evacuation and connection Vehicle washing system
9. Security systems
10. Paved areas
11. Communication systems, Buildings.
12. Power and lighting, Disinfectant-cum-deodorant, Application of daily soil cover.
13. Vehicles such as excavator-cum-loader, hydraulic tractor, compactor etc.
14. The Concessionaire will manage, operate and maintain all onsite plant and ancillary equipment that support the operations of the Facilities, including but not limited to: -
15. Weighbridge and registration system.
16. Waste receipt and storage.
17. Material Recovery System Recyclable storage.
18. Wastewater and storm water drainage equipment, Fire Fighting Arrangements Vehicle washing system, Security systems.
19. Paved areas, Communication systems, Buildings.
20. Power and lighting, Disinfectant-cum-deodorant.

The Concessionaire should ensure that all equipment, and vehicles are in good condition and are cleaned daily using disinfectants. The Concessionaire should further ensure that all the electro-mechanical equipment in vehicles are in working condition. Periodic inspections by the Monitoring Unit as well as the Independent Engineer should be undertaken to ensure the good operating conditions of vehicles and equipment. The Concessionaire should maintain the stock of spares to ensure the timely replacement for faulty or damaged ones. The damaged vehicles should be repaired or replaced in a timely manner in order to ensure uninterrupted operations at site, in accordance with the notice by the Monitoring Unit or Independent Engineer and the Concessionaire.

All O&M Personnel employed by the Concessionaire at the Integrated Solid Waste Processing & Disposal Facility and Facilities shall hold appropriate training and shall have sufficient relevant experience in the operation and management, to ensure the Integrated Solid Waste Processing & Disposal Facility and Facilities are operated and maintained in compliance with the requirements of the Agreement. The Concessionaire may outsource any part of the operation or maintenance of the Integrated Solid Waste Processing & Disposal Facility and Facilities if deemed appropriate. However, the Concessionaire shall be fully responsible for all operations and maintenance under the Agreement, whether outsourced or not.

The Solid Waste Management Services, including those activities undertaken by Concessionaire/sub-contractors, shall be in accordance with appropriate quality and environmental systems. The Concessionaire's quality and environmental systems shall comply with recognized standards such as [ISO 9000 and ISO 14000] or similar approved systems. The Concessionaire shall submit a QA-QC Plan as a part of the DPR to be made by the Concessionaire during the Planning Phase. The QA-QC plan shall have two components – one that will deal with the

requirements ***during construction and commissioning*** and the other ***during operations beyond the COD.***

The Concessionaire shall undertake all responsibilities in respect of the Authority under Applicable Laws and as otherwise required by the Agreement. The Concessionaire shall follow the EHS plan, as specified in Schedule 5.

Only SWM, as defined in the Agreement, shall be disposed of at the Integrated Solid Waste Processing & Disposal Facility. The Concessionaire will submit comprehensive procedures for the acceptance of waste at the Integrated Solid Waste Processing & Disposal Facility as part of the DPR to be prepared by the Concessionaire during the Planning Phase. Any modifications to these procedures shall be notified to the Monitoring Committee and Independent Engineer and approval shall be sought before implementing the same.

The vehicles and equipment employed in Integrated Solid Waste Processing & Disposal Facility and Facilities should not be used for any purpose outside the Integrated Solid Waste Processing & Disposal Facility and Facilities.

The Concessionaire shall be responsible for the maintenance of every element of the Facility and will be deemed to have taken consideration of all such maintenance requirements.

Any wastewater treatment units or tanks shall be maintained and dislodged in accordance with manufacturer's recommendations and as required to ensure optimum performance.

No maintenance, repair or replacement of any element of the ISWM Facility / Facilities will affect the temporary or permanent structural or operational integrity of any element of the Integrated Solid Waste Processing & Disposal Facility / Facility, or alter its function. The Authority will be advised of any such action and its agreement received in writing prior to it being undertaken.

The equipment, including all elements thereof, will be maintained in a safe condition at all times. The Concessionaire will ensure that at all times its maintenance and operating procedures are sufficient to ensure that, the Integrated Solid Waste Processing & Disposal Facility and Facilities are available to accept waste for and filling, in accordance with the approved Annual Operations Plan the Facilities are kept in good structural and operating order.

All Integrated Solid Waste Processing & Disposal Facility / Facility's equipment will be operated, calibrated, services and maintained in accordance with the manufacturers' instructions/O&M manuals. These requirements will be included within the maintenance plan for the Integrated Solid Waste Processing & Disposal Facility and Facilities, which is part of the O&M Manual. Prior to operation of the Integrated Solid Waste Processing & Disposal Facility and Facilities, the Concessionaire shall develop O&M manuals that will describe in detail the O&M system, including all O&M procedures and policies. The Concessionaire shall update and revise these O&M manuals as appropriate and get it approved by IE and MC. For Contingencies, Emergencies and Incidents. The Concessionaire will make written records and submit reports of all incidents, accidents, emergencies and remedial measures as defined and in accordance with the requirements. The Concessionaire will take all such actions and do all such things to ensure that emergencies are responded to as quickly as possible and the adverse effects are minimized. All records and reports of incident, accidents, emergencies and remedial measures will be included in the Progress Reports submitted to the Authority.

ii. Waste Receipt: -

a. Upon arrival at the Integrated Solid Waste Processing & Disposal Facility and Facilities, waste delivery vehicles shall be weighed, registered and directed to the tipping area of the Integrated Solid Waste Processing & Disposal Facility without undue delay.
b. The Concessionaire shall develop a suitable mechanism for separately recording the waste coming from each AUTHORITY in the Project Area.
c. The waste shall be unloaded at the tipping area, which shall be kept at a minimum size, and during the unloading the waste will undergo a second inspection prior to spreading, compacting. At the end of the Business Day, the waste shall be provisionally cleared from the tipping area.

d. Any waste not covered under the definition of SWM in the agreement shall not be accepted. In situations where loads or wastes are removed or rejected at the Integrated Solid Waste Processing & Disposal Facility, the Concessionaire shall record details of the date of occurrence, the types and amount of waste. A report containing this information shall be filed to the Authority by the Concessionaire within 24 hours from the time of the rejection.

e. The Concessionaire will be responsible for arranging and ensuring verification of the weighbridge. All recalibration is to be conducted and certified and carried out as per the weighbridge manufacturer's specification.

f. The Concessionaire shall operate the weighbridge area to ensure safe, efficient and proper use of the weighbridge facility by vehicles at all times with provision of CCTV cameras to be arranged at weighbridges.

g. The Concessionaire shall ensure that the weighbridges are not stopped for maintenance purpose – under unavoidable circumstances, a third party private weighbridge may be used for weighing after taking approval from IE and MC. The Weighbridge slips must be approved by IE/MC in such circumstances.

h. The IE shall have access to the database at all times to view, download and print weighbridge reports in formats to be agreed.

i. The Concessionaire shall record the following minimum data with regard to the incoming waste:
    a. Date of operation.
    b. Truck Number.
    c. Name of AUTHORITY.
    d. Total laden weight of the vehicle Time and Date of entry of the vehicle Total unladen weight of the vehicle Volume of the vehicle.
    e. Time and Date of exit of the vehicle Name of Driver.
    f. Complaint Register from Nearby Areas.
    g. The Concessionaire shall record the following minimum data with regard to the outgoing waste from Facilities.
    h. Date of operation Truck Number Name of AUTHORITY.
    i. Total laden weight of the vehicle
    j. Time and Date of entry of the vehicle
    k. Total unladen weight of the vehicle
    l. Volume of the vehicle
    m. Time and Date of exit of the vehicle
    n. Name of Driver
    o. Complaint Register from Nearby Areas.

iii. Processing Facility: -

The Concessionaire shall ensure that the processing facility/facilities at Integrated Solid Waste Processing & Disposal Facility and Facilities are maintained to the standards and specifications as set out in the Construction Requirements and also meet the other requirements, if any, set out in the Agreement and shall follow BIS standards BIS Codes, SWM rules, CPCB Norms and any other statutory norms that may enforce during the concessionaire period must follow and agree by the concessionaire. In the design, planning and implementation of all works and functions associated with the operation and maintenance of the Processing Facility, the concessionaire should take all such actions and do all such things (including without limitation, organizing itself, adopting measures and standards, executing procedures including inspection procedures, and engaging contractors, if any, agents and employees) in such manner, as will: Ensure the safety of personnel deployed and users of the Processing Facility or part thereof; Keep the Processing Facility from undue deterioration and wear and tear; Permit unimpaired performance of statutory duties and functions of any Party in relation to the Project; During the operations of the Processing Facility after the C&T COD, the concessionaire shall, in respect of the Processing Facility, ensure that

Applicable and adequate safety measures are taken; The Processing Facility are kept free from undue deterioration and undue wear and tear; Adverse effects on the environment and to the owners and occupiers of property and/ or land in the vicinity of the Processing Facility, due to any of its actions, is minimized; Any situation which has risen or likely to arise on account of any accident or other emergency is responded to as quickly as possible and it adverse effects controlled/ minimized; Data relating to the operation and maintenance of the Processing Facility is collected, recorded and made available for inspection by concerned; All materials used in the maintenance, repair and replacement of any of the Processing Facility shall meet the Construction Requirements;
The personnel assigned by the Concessionaire have the requisite qualifications and experience and are given the training necessary to enable meeting the O&M Requirements.

The Concessionaire should ensure the operations and maintenance is carried out as per the Operational Plan as specified in the O&M Manual. A disinfectant-cum-deodorant spray mechanism shall be provided to spray the required quantity of the chemical in an adjacent area for Sanitization that reduces mal-odor and repel insects and birds. Further, the facility shall be managed in such a manner that it may not attract birds, thereby avoiding the likelihood of any bird aircraft collision.

The concessionaire should also provide and maintain a / Incineration for the treatment of dead animals, including all carcasses, visceral remains, hides, hoofs or such other animal parts which are found within the Project Area and shall ensure that the only the ash of animals is dumped in the landfill site.

Iv. Landfill Facility: -

The Concessionaire would ensure that the Landfill for Interim Phase and Landfill for ISWM Operations Period are operated and maintained to the standards and specifications as set out in the design and development of the said site and also meet the other requirements, pertaining to environmental safety of the facility.

The Concessionaire would organize himself in adopting measures and standards, executing procedures including inspection procedures, and engaging contractors, if any, agents and employees in a manner to ensure The safety of personnel deployed on and users of the Landfill Facility, to keep the Landfill Facility from undue deterioration and wear, and permit unimpaired performance of statutory duties and functions of any party in relation to the facility. Before the start of operations of the landfill, the Concessionaire would include in O&M Manual the plan for important aspects of Landfill Operations such as, but not limited to, waste unloading spreading and compaction, waste discharge and inspection, maintaining a daily cover, intermediate cover, and pollution prevention during landfill management, bird control, vermin control, landfill fire management and landfill safety aspects etc. All waste rejects from MRF & Processing Facility shall be accepted at the landfill after due inspection and approval. As per the SWM rules, if there is no path way or sale for disposal of RDF, the same shall be stored in the landfill until the sale happens as per the SWM rules 2016 and Statutory norms. Unloading of waste from delivery vehicles is a potentially hazardous operation. All drivers should be trained to be fully aware of the site rules governing the unloading of waste and obey instructions issued by site-in- charge. Waste should be unloaded at discrete discharge points as directed by site operatives. A minimum of two discharge points would be maintained at all times. Control would be exercised over the number of vehicles permitted into the discharge area at any one time. Comprehensive sign – posting would direct all drivers to the specific discharge point they should take the waste to Energy. The designed tipping slopes should be maintained during tipping operation. The waste should be spread in the cell area in layers not exceeding 50 cm and should be compacted by the compactor. The subsequent loads are pushed above the initial layer to form the design cell height and to attain the design slopes. Considerable care should be taken when placing the initial lift of waste above the landfilling and leachate collection layer. Individual items of wastes that may be deemed to be unsuitable, if these are large or bulky and likely to penetrate or deform the basal engineering measures, should be stockpiled and, as soon as the initial lift becomes of sufficient extent, should be incorporated into an early second lift. The Concessionaire shall provide the calibration certification from the manufacturer/ independent certification agency for the weigh-bridge. The weigh-bridge shall be non- operational for not more than 7 days a year. Data recording and reporting format shall be decided in consultation with Independent Engineer and shall

form part of the O&M Manual. The Concessionaire shall record the following minimum data with regard to the Landfill Waste: -

a. Date of operation
b. Truck Number
c. Name of AUTHORITY
d. Total laden weight of the vehicle
e. Time and Date of entry of the vehicle
f. Total unladen weight of the vehicle
g. Volume of the vehicle
h. Time and Date of exit of the vehicle
i. Name of Driver
j. Complaint Register from Nearby Areas

The procedure for weighing of the Landfill Waste and certification by the IE shall be, as set out in the O&M Manual. Waste Discharge and Inspection: The Concessionaire should obtain a "Fit for Landfilling" certificate from the IE based on the definition of Residual Inert Matter and Other Inert. Waste would be discharged by tipping at the working area of a landfill, within the area demarcated for the cell. Every discharged load would be visually inspected by a designated Concessionaire. Working area personnel would be trained and competent at waste identification in order that they can recognize waste which may be non-conforming. In the event of reasonable doubt as to the waste acceptability, the Concessionaire would inform the waste reception facility and/or the site manager immediately.

iv. Intermediate Liners:

The Concessionaire would provide a liner layer ("Intermediate Liner") before the onset of monsoon leaving only a temporary un-restored sloping face. The Intermediate Liner shall be as per the Construction Requirements.

Landfill Daily Cover:

The advantages of using daily cover are to prevent windblown litter and odors, deterrence to scavengers, birds and vermin and in improving the site's visual appearance. It is also advocated as a means of shedding surface water during the filling sequence, thereby assisting in leachate management by reducing infiltration. The concessionaire can use construction debris as cover material in place of fresh earth, if available. Daily cover should not be rolled and compacted as a compacted daily cover leads to a diminished void ratio, leading to leachate becoming perched and difficult to extract.

Landfill Fire Management:

Landfill fires are a common phenomenon in most of the landfill sites. All fires on-site would be treated as a potential emergency and dealt with accordingly. The site would be accompanied with an emergency tipping area, set aside from the main operational area. Fires within the operational area are either surface fires or deep-seated fires. The former usually occur in recently deposited and as yet un-compacted materials adjacent to the current working area, whilst the latter are found at depth in material deposited weeks or months earlier. The concessionaire should prepare and submit a plan to deal with each type of fire. Regardless of the circumstances, no individual should ever tackle a landfill fire alone.

Special Operational Conditions:

The Concessionaire would provide a benching (terrace) of 3-5m width for every 5m – 10m height of filling within the Engineered Sanitary Landfill. The slope of the Engineered Sanitary Landfill face shall not exceed 1:3.

Final Cover and closure:

After reaching the final height for laying of the final cover, the Concessionaire would seek approval from the authority and submit a plan for closure of that cell. The Concessionaire would provide the final cover in accordance with the construction requirements.

Leachate Collection and Removal:

The Concessionaire should ensure that there is no overflow of leachate from the leachate collection and removal system and that all leachate drains are free from clogging and allow unobstructed flow of leachate. No untreated leachate to be let out from the Site.

Gas Recovery and Greenhouse Gas mitigation system: -

The Concessionaire shall ensure that the greenhouse gas emissions from the Landfill Facility conforms to the permissible limits as per Applicable Law and be collected in accordance to the design & construction requirements. Based on the analysis, if the landfill gas is effective (active vent system) shall be flared with proper arrangement and in no case (passive vent system) shall be let out into the atmosphere. The Integrated Solid Waste Processing & Disposal Facility and Facilities shall be inspected by IE, or Person acting in such role, at least once every week. The inspection will include details, comments and recommendations for action on the following general items at a minimum:

Compliance with Environmental Management Plan: -

Weather conditions/meteorological data; Compaction of waste; Covering of waste; Litter netting; Condition of roads; Wheel cleaning operations; Integrated Solid Waste Processing & Disposal Facility housekeeping; Control of birds, vermin and insects; Surface water system; Surface water condition; Ground water control; Condition of receiving watercourses; Environmental nuisances – litter, odor, noise, dust; Topography of the site: data on the landfill body; Security; Fence and gates. The Site inspection findings shall be recorded as ISWM facility Inspection Report and filed. These reports should be available for review during the visit of the External auditor or by Authority itself.

The Concessionaire will provide, maintain and bear the full operational costs, for the following services at a minimum Electricity; Energy; Water; and Telecommunications (telephone, facsimile, email and internet).

The Concessionaire will be responsible for: -

Ensuring adequate 24 hour security of the Integrated Solid Waste Processing & Disposal Facility and Facilities; Ensuring that there is no unauthorized access to or use of the Integrated Solid Waste Processing & Disposal Facility / Facilities including scavenging; and Ensuring that building, stores, fences and gates, equipment etc. are secured outside operating hours.

The Concessionaire will undertake regular risk assessments of the Facility's operations and provide a copy of these in the Progress Reports to the Authority. In addition, the Concessionaire shall also arrange for

regular Site inspections by the Independent Engineer and shall provide copies of any reports to the Authority. These audits would be quarterly for the first 3 years of operation and thereafter semi- annual audit reports should be submitted. The reports should clearly indicate at least the following: -

- Summary of monitoring status including air quality, noise, groundwater, and surface water.
- Accidents, spills and emergencies.
- Complaints and their redress EHS Issues and their mitigation.
- Operation statistics - The amount of waste received, recycled, processed and disposed, efficiencies of operations of equipment and processes;
- Status of compliance with various regulations; and Any items requiring the Authority's intervention.

The Concessionaire shall provide O&M for Mandatory Facilities at Integrated Solid Waste Processing & Disposal Facility as shown in table below:

Description of Facility	**Operation and Maintenance Standard**
Storm water drainage system	All storm water drains are free from clogging and allow unobstructed flow of water. Maintain shape and scope in the designed manner during the Project.
Leachate Collection & Drainage System	No overflow of leachate from the leachate collection tanks Cracks or leaks in the leachate collection and drainage system to be sealed immediately Free from clogging and allows unobstructed flow of leachate
Water supply system	Water for drinking purposes to meet IS 10500 Water supply for gardening and flushing to meet the inland surface.
Quality control laboratory	Quality and calibration certification from a manufacturer/ independent certification agency.
Internal roads	The main roads shall be pot-hole free and in good motor able condition.
Lighting & other electrical works	Minimum lux level of 20 in the area of operation (in case of 2 shift operations).
Boundary Wall	Any breach in the boundary Wall to be sealed promptly. Boundary Wall to be inspected periodically.
Green belt	Maintained in accordance with O&M Manual.
Work shop	Vehicle puncture and emergency repair works.

Environmental Baseline Testing and Monitoring: -

Before commencing development, concessionaire shall undertake various investigations as mentioned hereunder:

a. Investigation: -

A detailed investigation plan may be drawn up in consultation with a geotechnical engineer. The output from such an investigation should yield the following:

Stratification of subsoil – type of soil and depth to groundwater table and bedrock (if located within 10m of base of landfill) Permeability of various strata beneath the landfill
Strength and compressibility properties of subsoil Extent of availability of liner material, drainage material, top soil, and protective soil in adjacent borrow areas Subsoil properties along approach road.

b. **Groundwater/Hydrogeological Investigation: -**

A detailed investigation plan shall be drawn up in consultation with a ground water specialist/water resources engineer or a hydrogeologist. The output from such an investigation should yield the following: Depth to groundwater table and its seasonal variations Ground water flow direction Baseline groundwater quality parameters – all drinking water quality parameters.

c. Environmental Investigation: -

The following baseline parameters must be established for a one-year period prior to construction of a landfill:

- ***Ground Water Quality***: Minimum of 3 samples from each aquifer analyzed on a monthly basis for drinking water quality parameters.
- ***Surface Water Quality***: Minimum of 3 samples from a stream/storm water drain analyzed on a monthly basis and for parameters relevant for wastewater drains.
- ***Landfill Gas****:* Sampling and analysis for methane, hydrogen sulfide and other gases on a monthly basis. **Dust**: PM 10 (Particle size less than 10 Microns) monitoring on a monthly basis, specifically at noon, during hot, dry, windy days.
- ***Odour***: Monthly analysis at the site and at 200m intervals from the landfill boundary to the nearest inhabited zone.
- ***Noise****:* Peak noise analysis at the site and nearby inhabited zone on a monthly basis.
- ***Vegetative Cover***: Vegetative mapping on a seasonal basis.

d. Leachate Investigation: -

Leachate quality shall be assessed from both laboratory studies and field studies. Laboratory leachate tests may be performed. In addition, leachate samples should be analyzed from existing waste dumps near the Integrated Solid Waste Processing & Disposal Facility.

The Concessionaire will be responsible for onward monitoring necessary to assure that the Solid Waste Management Services including waste processing and landfilling are in accordance with Applicable Laws and Applicable Permits. Monitoring shall be carried out in the following four zones and also, as per the requirements of approved environmental monitoring plan of EIA report:

- On and within the Sanitary Landfill.
- In the unsaturated subsurface zone around the Sanitary Landfill.
- In the groundwater (saturated) zone around the Sanitary Landfill.
- In the atmosphere/ local air above and around the Sanitary Landfill.

The Concessionaire will include the results of such monitoring in the Bi-Monthly Progress. Reports submitted to the Authority. The Concessionaire will provide and maintain safe and permanent access to all monitoring points within the Facility. The Concessionaire will maintain and clearly label all monitoring points within the Facility in a suitable manner.

Prior to operation of the Integrated Solid Waste Processing & Disposal Facility, the Concessionaire will submit to the Authority the names, qualifications and details of relevant experience of individuals assigned to carry out and interpret all sampling and monitoring within the Facility as specified to be carried out by the Concessionaire.

The Concessionaire will maintain an up-to-date record at the Integrated Solid Waste Processing & Disposal Facility of the names and qualifications of all Persons who carry out all sampling and monitoring within the Facility as specified to be carried out by the Concessionaire and who carry out the interpretation of the results of such sampling and monitoring.

All monitoring data generated at the Facility shall be kept by the Concessionaire safely at the Integrated Solid Waste Processing & Disposal Facility site. The Concessionaire will develop and maintain an electronic data management

system for collating, assessing, presenting and archiving of all such data with suitable backup.

The Concessionaire will monitor (off-site or fence line monitoring) ambient air quality at regular intervals as per the recommended norms and guidelines of GoI and GoK regulations.

Parameter	**Acceptable levels**
Sulphur dioxide	*120 µg/m3 (24 hours)*
Suspended Particulate Matter	*500 µg/m3 (24 hours*
Methane	*Not to exceed 25% of Lower Explosive Limit (equivalent to 650mg/m3)*
Ammonia daily average	*0.4 mg/m3 (24 hours)*
Carbon monoxide	*2 mg/m3 (1-hour average) 1 mg/ m3 (8 hour average)*

The Concessionaire will monitor water quality at points which interface between the site and external environment (e.g. drains or canal converging into the river or a sewerage system, land disposal) and will take all necessary measures to satisfy effluent quality as per the applicable Indian regulations and guidelines.

Monitoring frequency: -

Description	**Frequency**
During Active Period	
Leachate quantity	**Daily**
Ground water quality- within the site	Once in 3 months or as per the IS Code of Practice
Ground water quality- Outside the site	Once in 6 months or as per the IS Code of Practice
During Post Closure period	
Movement of the Sanitary Landfill cover Leachate quantity	**Yearly Quarterly or as per the SWM/ KSCB/CPCB/MOEF&CC norms/ BIS Norms**
Leachate quantity	Quarterly
Ground water quality- within the site	Once in 6 months
Ground water quality- outside the side	Once in 6 months
Gas Quality	Once in 6 months

Note: All above monitoring frequency and maintenance of the quality shall be as per the **SWM 2016 guidelines/ KSPCB/CPCB/MOEF&CC / BIS Norms. No deviation is permitted**

SCHEDULE 23 – GENERAL TECH SPECIFICATIONS FOR PROCESSING & DISPOSAL

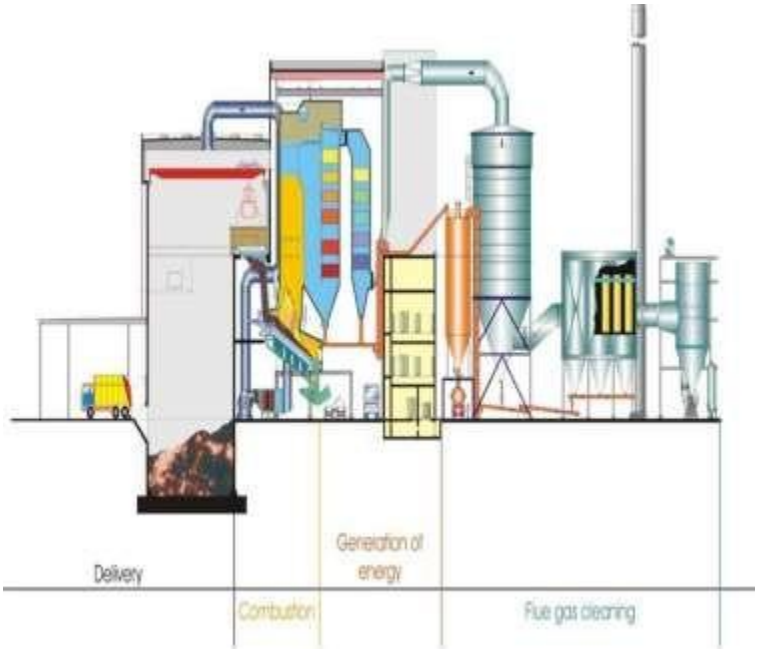
General Technical Specifications for Processing & Disposal facility: -

1. Ballistic separator / Trommels as per the design
2. Conveyor with Dual Trommel
3. Truck Mounted Refuse Compactor – 14m^3 Capacity
4. Excavator cum Loader
5. Front end Loaders
6. Tractor Trolley for Hydraulic Tractor
7. Landfill Compactor
8. Weighbridge 50 MT Capacity

Sl. No.	Waste Processing Mechanism	Description
1.	**Wet waste**	
	a. Bio methanation	Up gradation of technology from aerobic composting process to mesophilic anaerobic digestion will lead to improved utilization of organic fraction of solid waste. Processing of wet waste based on Maximum Yield Technology (MYT) ➢ It is a new treatment and utilization of residual household waste. ➢ MYT breaks down into four components, treating them according to their specific material and extracting the maximum potential from them. ➢ Mechanical pre-treatment breaks the waste down automatically into individually defined fractions, according to the material of different size. ➢ The "biological step" ensures particularly efficient and stable process flows. Simple and robust aggregates guarantee maximum operational security at simultaneously low investment and operational costs. ➢ Interim storage permits a flexible and consistent dosage of biological process steps. The targeted reproduction of microorganisms ensures high level and constant biological activity. ➢ Then, the waste is selectively homogenized. ➢ After a short retention time in the mixer, presses dewater the solid material which is ideally prepared for biological drying. ➢ Microorganisms living in biogas fermenters generate biogas from organic compounds. ➢ At the end of the process, we get nutrient rich water to be used as a liquid fertilizer in the agriculture industry. Bio CNG as a product has an already demand both for government as well as private offtake. In addition, fermented organic manure has also much better quality and market acceptance as compared to the organic manure. Also, since the technology leads to formation of Bio - CNG, fermented organic manure and liquid digestate from source segregated organic fraction of solid waste, in comparison to organic compost of solid waste, in comparison to organic compost from the existing plants, there will be a significant additional reduction in carbon emission. Minimum Area required for the installation of Bio- CNG plant of 2500 TPD (excluding impurities up to 10%) is around 30 acres. In a similar proportion, the land shall be earmarked for the proposed capacity of Bio CNG plant based standards mentioned in BIS draft specifications and MOUHA guideline on Circular Economy Guidelines or SBM 2.0 Guidelines

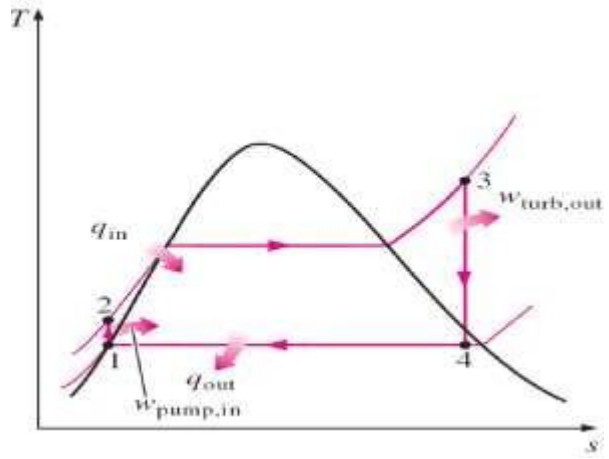
		The Proposed --- TPD (excluding impurities up to 10%) capacity Bio- CNG Plant at _____will comprise of the following main components: ● Waste Reception Area (Deep Bunker) ● Pre Treatment Facility ➢ EOT Crane ➢ Primary & Secondary Hoppers ➢ Trommels ➢ Hammer Mill ➢ Conveying System ● Anaerobic Digestions(Digesters) ● Digestate Treatment (Solid / Liquid Separation) ● Biogas system ● Effluent Treatment Plant ● Windrow Composting ● Combined Heat and Electricity Production System ● Biogas Upgradation System ● Biogas Storage System ● Odour Control System
	b. Composting	The Solid substance that comes out as an inert/ solid waste from the Bio-methanation process shall undergo the composting process. The main processing technology used for composting is Aerobic Composting. The organic material present in SWM is converted into stable mass by aerobic decomposition. Aerobic microorganisms oxidize organic compounds to carbon dioxide and oxides of nitrogen and carbon from organic compounds used as a source of energy, while nitrogen is recycled. The module has a concrete platform where windrow piling operations are being organized. The height of each windrow is limited to 2.5 meters to ensure effective aeration. During windrow processing, care is being taken to maintain the required temp/moisture levels. An appropriate microbial culture and treated leachate is applied for faster biodegradation. The retention period for the waste in the windrows is 4 weeks. The windrows are turned every week to ensure proper aerobic conditions by specialized equipment called Compost Turner. After maturation and fermentation processes, the organic matter will be cleaned from remaining improper material. This step is called compost refining and its aim is to obtain a cleaner product before its sale. The trommel is fed by means of a belt conveyor and will screen material at 12mm, considering that elements with a size above 12mm are refused and removed from the process.
	c. LTP	Leachate Treatment Plant Facility is to be installed so that leachate coming from the composting and processing facility is treated and Wastewater is reused. This treatment facility requires reducing the BOD and COD to the Permissible limits of CPCB norms. Nothing is discharge in natural stream, i.e. Zero Liquid Discharge system.
2.	**Dry Waste**	
	a. MRF	The proposed material recovery facility (MRF) shall accept source segregated dry waste material and shall further separate, process and store them for later use as raw materials for remanufacturing, reusing and reprocessing. Material Recovery Facility (MRF) is also known as Material Reclamation Facility or Material Recycling Facility. The waste material is basically segregated into different streams of waste fractions (paper, plastic, packaging paper, bottles etc.) which in turn shall be supplied to the recycling industries. MRF shall require medium to large storage spaces depending on the type of material fraction for temporary storage sorted recyclables which can be made available to recyclers in bulk quantity. In the proposed MRF, the entire process will be carried out with sophisticated systems and equipment that enable efficient separation of large quantities of material into different fractions. The main function of the MRF is to maximize the quantity

		of recyclables processed, while segregating materials that will generate the highest possible value from the recycling market. MRF also helps in segregating combustible fraction (RDF), non-recyclables and inert from the dry waste stream. These fractions may be utilize/reused as: • Recyclables – Reuse/ reprocessed • Non-recyclables - Road making/ plastic to oil • RDF - Waste to Energy/ Cement Industries • Inert - C&D plant/ daily cover of SLF **Plant Configuration:** The proposed facility is designed as a Dry Waste MRF that shall receive source segregated or commingled recyclable materials (recyclable materials that are already separated from other main solid waste or wet waste). Dry segregated material shall be received in a commingled form consisting of a combination of paper, cardboard, magazines, plastics etc. and commingled containers (plastic, glass, metal, etc.), among other materials. The proposed system involves following equipment: 1. Moving Bed Feeder 2. Trommel Unit 3. Conveyors 4. Magnetic Separators 5. Air Density Separator 6. Electrical Panels 7. Manual Sorting Stations **Operation & Process Flow:** The complete material and process flow in the MRF shall be as per below 1. Incoming fresh waste is unloaded in the waste receiving pit. Pit is around 1.5 m deep. Holding capacity of the pit is for 2-3 days. i. The material is directly fed in a moving bed feeder which can take loads of 1- 2 cum at a time. Grab cranes of 2 Cu M will be used to feed material. ii. MBF feeds Trommel Screen 35 /100 at Slow rate. The feed rate can be adjusted steplessly using VFD automatic control. iii. Material fed to the trommel screen is screened in two stages. First section has fine perforations of 35 mm which removes out all fine material, road sweepings etc. This is mostly dry & inert waste which needs to be sent to landfill. iv. Process Conveyor 100 mm collects all wet fraction & transfers it to reversible loading conveyor which is Bi-directional conveyor and it loads material alternately in vehicles for transfer of material to compost pad for aerobic composting. v. All +100 mm material is collected on Transfer 100 conveyor which in turn is feeded to the 175 mm trommel screen. vi. This trommel has dual perforations of 175 & 400 mm. vii. First section has a 175 mm screen which screens out all -175 mm material and feeds the same to the air density separator. viii. The 175 mm trommel has 400 mm perforations. This section screens all -400 mm material and transfers the same to ADS feeder conveyor 400 mm. ix. All oversized materials pass through a sorting conveyor to facilitate manual sorting of recyclables. Finally, left-over material falls in an inert collection pit from where periodically material is transferred to landfill. x. ADS feeder conveyors feed respective Air Density Separators. xi. Air Density Separator further separates material based on heavy & light fractions.

		xii. All heavies are collected on Heavies Sorting Conveyor, where they are sorted for recovery of recyclables. All leftover material is stored in an inert collection pit which holds material which needs to be transferred to landfill. xiii. All light fraction falls on a lights sorting conveyor where all recyclables are manually sorted. All leftover material is suitable as RDF so it is dropped in the RDF collection pit. xiv. All Recyclables are collected in respective recyclables collection bays for further sale of processing thus, complete separation of Mixed Waste into wet & dry waste is achieved mechanically. Thereafter reducing dependency on source segregation.
	b. Waste to Energy	**Power Generation Unit:** SWM is highly heterogeneous and the percentage of its constituents varies widely depend the source. Further seasonal changes also contribute to the higher level of heterogeneity in To assess the suitability of any technology for processing SWM, it is very important to b analyze the composition and the weight fraction of each of the constituents with refere different sources of its generation. The controlled combustion of waste with the recovery of heat to produce steam that i produces power through steam turbines. Combustion process needs sufficient quantity of complete combustion of the incoming SWM to generate heat energy. ● Combustion of SWM allows huge savings at the landfill as the volume of S reduced in the form of ashes and slag as compared to the original waste volume. ● In WTE plants based on Combustion, the entire energy contents of waste are recc except the unavoidable fraction that is lost through the flue gas, cooling devices, walls and ashes. ● Considering all the above, Combustion of SWM to produce power will be the opt this project.  Fig: Typical sectional view of WTE facility **POWER PLANT SCHEME:** The steam cycle defines the transformation of the heat energy to the mechanical energy turbine shaft, through the various thermodynamic processes that are capable of producing heat flow or work when placed between the energy source and energy sink. The heat en derived from burning of some fuels or using heat energy already available in the hot waste The cycle needs a working fluid and steam is considered for the same. Steam is viewed

most favored working fluid mainly because of its unique combination of high thermal capacity, high critical temperature, high latent heat, excellent heat transfer characteristics, wide availability at cheaper cost, nontoxic and noncorrosive nature.

All the steam based power plants operate under the Rankine Cycle. In simple terms the Rankine Cycle is described as the combination of the various processes like the isentropic compression of water in the boiler feed water pumps (1 to 2), reversible heat addition to the working fluid (2 to 3) through the liquid, two phase and superheat states, isentropic expansion of the working medium in the turbine (3 to 4) and the constant pressure heat rejection to the atmosphere (4 to 1) through the condenser.

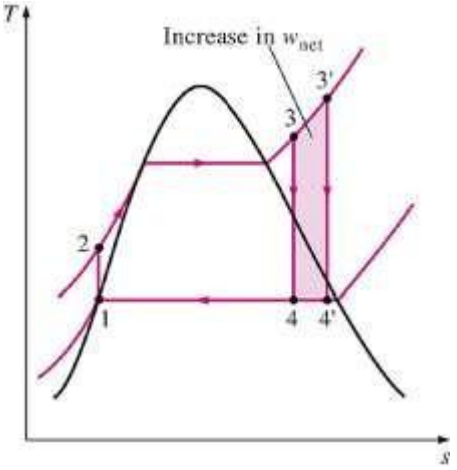


The cycle to be adopted for this project will be a modified Rankine Cycle with the addition of a Regenerative feed water heating.

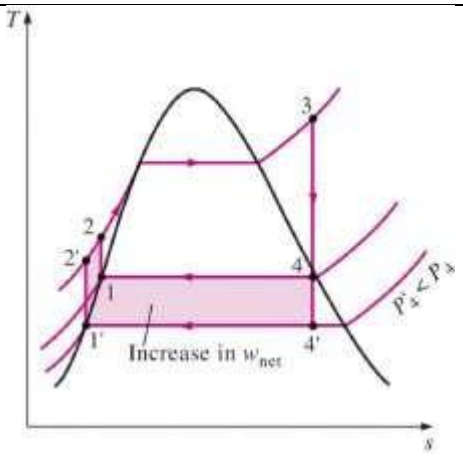
High pressure and high temperature cycles are crucial for increasing the operating efficiency and the power output from the power Plants. The choice of the level of the pressure and temperature for the cycle depends on the level of confidence in the plant operators, quality of the feed water and the water treatment systems available, type and characteristics of fuel to be combusted, capacity of the power plant and the cost of the high pressure/temperature boiler and Turbo generator systems and the financial benefits realizable from the power plant by way of the sale of the exportable power.

Thermodynamically, energy recovery from the Rankine Cycle is more dependent on the following factors:

- Steam inlet temperature to the steam turbine
- Steam outlet pressure from the steam turbine



Increase in power output due to variation in the inlet steam temperature

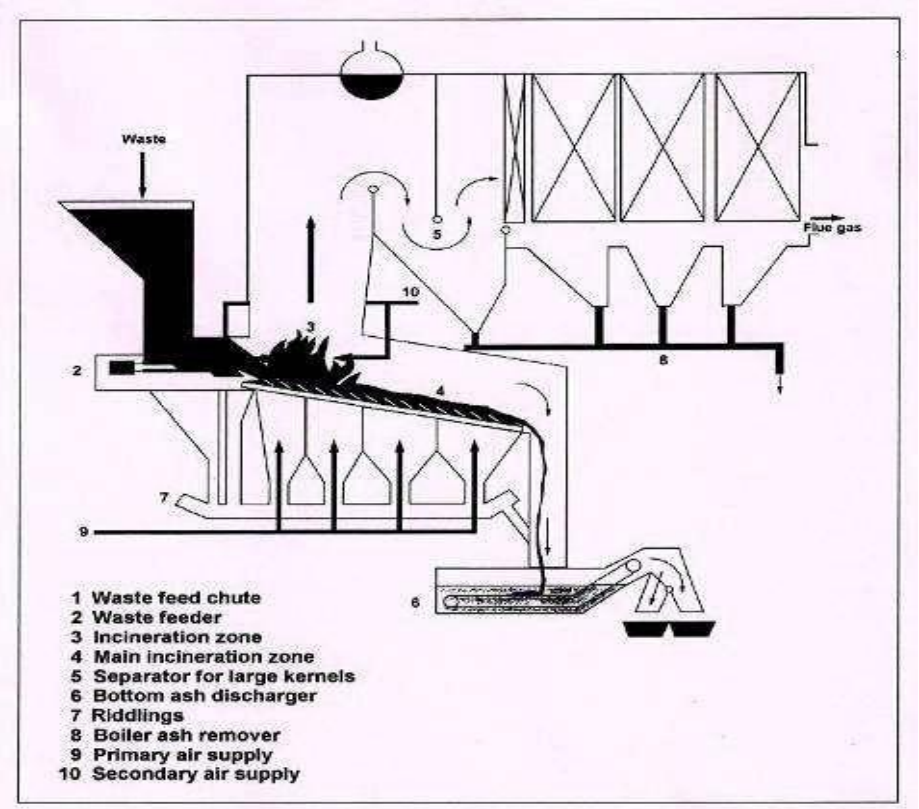


Increase in power output due to variation in outlet pressure

Higher the inlet steam temperature (3 to 3' in above figure), higher the cycle power output and in-turn higher cycle efficiency. However, because of the nature of the working medium which is steam, the pressure also plays a major role in ensuring the optimum extraction of the useful energy from the working medium and hence, the increase in the steam temperature should be accompanied by the matching increase in the pressure. However, the practically attainable limits of temperatures are influenced by the metallurgy of the boiler tubing, piping and the turbine components and the complexity of the Creep fatigue interaction for the materials at higher temperatures.

It is also extremely important that the selection of the temperature is done keeping in mind the nature of the industry, type of fuel to be combusted and its characteristics capacity of the power plant under consideration, etc. Considerations such as cost, maintainability, provision of adequate safety margins, the experience of the industry so far and the level of the operating personnel available in the industry, enable us to select the practical limit on the steam temperature for the plants of the subject size and nature.

Considering the above, it is proposed to install steam generator with outlet steam parameters of 45 bar (a) and 400±5°C. The steam inlet to the turbine will be 42 bar(a) and 395±5°C, with the difference in the pressure and temperature accounting for the losses in the steam piping from the boiler to the turbine.

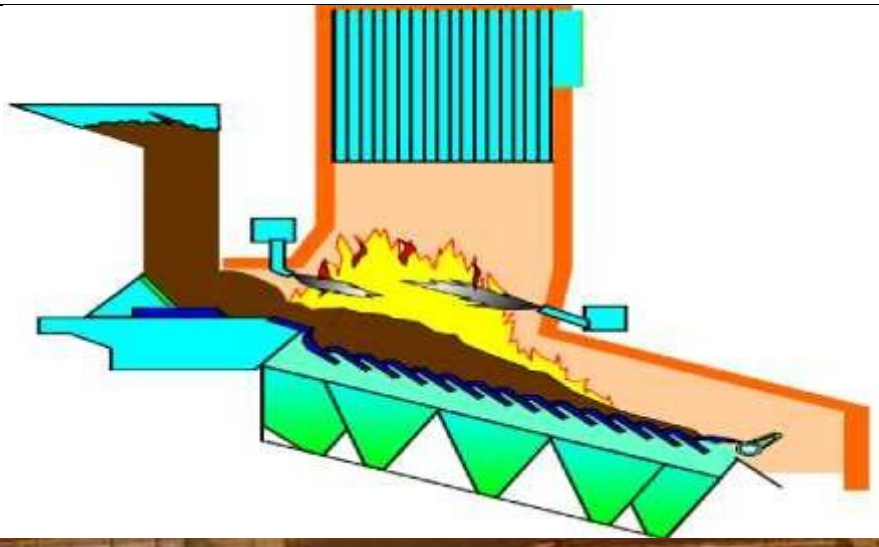


Thermal Processes:

There are many combustion technologies available for combustion of SWM, namely, m oving grate, rotary kiln and fluidized bed. Moving grate technology being the most feasible, well p oven and widely used technology for combustion of mixed waste is suggested for the proposed roject. Other thermal processes like gasification and pyrolysis exist but have not been prove on a commercial scale.

Among various available moving grate designs, the Reciprocating (also called pusher) grates constitute the most widely used and effective way to move waste internally in the boiler combustion zone. Reciprocating grate system resembles stairs with alternate fixed or m oving grate sections. The pushing action may be in the direction of movement of waste or in an u ward motion against the waste flow.

Schematic Representation of a Reciprocating Grate Facility(fig)



- We propose to use a reciprocating grate with air cooling along with Ram Feede r for smooth and uninterrupted feeding of waste. Water-cooled grate combustors ha ve the added advantages of better combustion control and the ability to process municipa solid waste with higher heat content.
- Major component of the moving grate incinerator includes:
  - ✓ Incineration grate,
  - ✓ Bottom air discharger,
  - ✓ Incineration air duct system,
  - ✓ Incineration chamber,
  - ✓ Auxiliary burner
  - In this type of incinerator, waste is fed into the grate system by a conveying s ystem and the grate moves the waste through various zones of the combustion cham ber in a tumbling motion. The main function of the moving grate system is to transpo rt the material to be incinerated through the furnace; stoking and loosening of mate rial to be incinerated; and positioning of the main incineration zone in the incin ration chamber. The normal residence time of the waste on the grate is 60 minutes to 120 minutes. Combustion takes place above the grate in the incineration chamber.
  - Combustion air is admitted in two stages; in the primary stage, the air is ad mitted below the grate/ through sides; and in the secondary stage, air is located abov e the grate to ensure better air penetration and turbulent mixing for complete comb stion.

		The admission of the secondary air will reduce the temperature of the combu stion products thus lowering the formation of NOx. The correct proportion of prim ry and secondary air will also reduce CO formation. ● A minimum gas phase combustion temperature of 950^{o}c is required to be mai tained and minimum residence time of 2 seconds above this temperature is requi red to achieve good burn out of combustion gases. The bottom ash discharger is use d for cooling and removal of solid residue that accumulates on the grate. ● Energy recovery is the added benefit of combustion and is done by passing th flue gas carrying the energy released in the waste incineration, through a boiler. Boiler has primarily two functions; first is to cool the flue gases; and second is to tr ansfer the heat from the flue gases to another fluid, usually water which most ften is converted into steam inside the boiler. ● We propose a water wall furnace (Membrane water wall) where the walls of the combustion chambers are made up of water filled heat exchange pipes to co ol the combustion gases. A suitable refractory will cover the lower portion of the tub e walls by means of studs where the temperatures are the highest and the environm ent is most aggressive from the corrosion and slagging point of view. ● The energy transferred to the boiler will be used for generation of steam or ho water, and generation of electricity. The proposed system of water walled boiler wi l have radiant passes& convective passes for the heat transfer from hot gases: ● Most of the heat transfer will be through radiative heat transfer to the water walled tubes close to grate and the tube banks in multiple passes thereafter ● Also, convective heat transfers to the tube banks, superheater tubes and the boiler feed water in the economizer. ● The steam generated from the boiler shall be expanded in a steam turbine gen erator to generate electricity. The steam turbine will exhaust steam to a condenser, where it is condensed to water. ● The flue gas from the combustion process might contain corrosive materials/ gases including particulate matter (dust), chlorides, Sulphur compounds and tra es of heavy metal. The type of pollutants and their concentration depends on the composition of input waste and combustion conditions. It may be noted that at low temperatures, the presence of Sulphur counteracts the attack by chlorides. Co rosive effects of these gases can be significantly controlled by keeping the gas temp rature within the range of 650-675^{o}C.

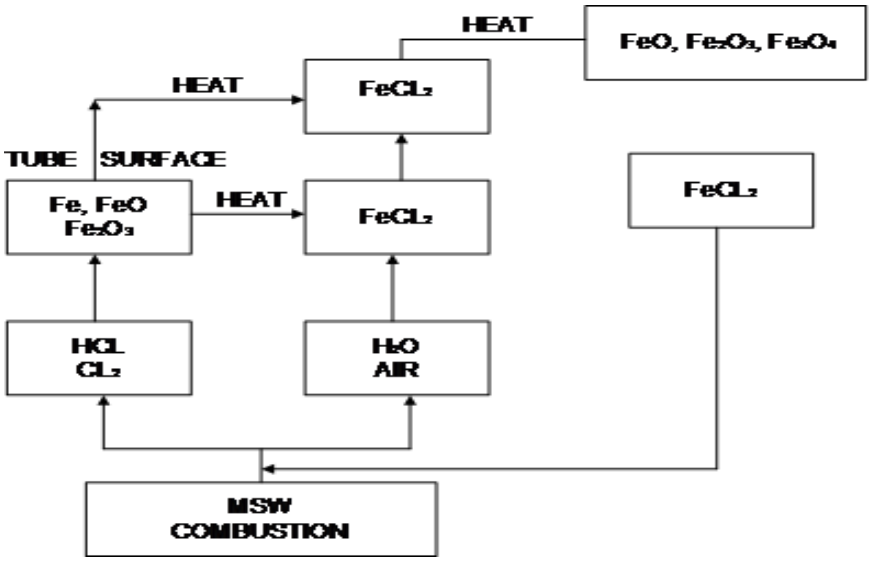


Fig: Corrosion Diagram

- Presence of carbon monoxide due to incomplete combustion can also create problems to the super-heater due to its corrosive nature. Our proposed system shall have the provision of supplying optimized secondary air to ensure complete combustion of fuel.
- Considering the nature of the fuel to be municipal waste, its heterogeneity and problems associated with fuel feeding & charging systems, the operating parameters are proposed to be 45 bar (a) and 400±5°C of steam at the boiler outlet. The steam inlet to the turbine will be 42 bar (a) and 395±5°C, after accounting the losses in the piping from boiler to the turbine inlet valve. However, will be optimized during detailed Engineering.

Proposed Design:

The WTE Power plant will be designed for year round operation, for combusting the SWM

Ambient / Site Conditions

Plant Location	:	Bengaluru
Temperatures:		
Temperatures (Min/Max)	:	7.3^0C / 47^0C
Design Temperature for Performance	:	30^0C
Design Temperature for Electrical	:	50^0C
Temperature variations	:	7^0C to 45^0C
Relative Humidity		
Plant Design Relative Humidity	:	60%
Design Wind Velocity	:	As per IS 875
Seismic Co-efficient	:	As per IS 1893
Water Resource	:	NDMC

- Boilers of ranging suitable capacity with the gross power generation potential of about 36 - 40 MW or more as per requirement through steam turbine generator at optimum

calorific value. However, the plant was designed to operate at a range of calorific values with a range of power generation considering the variance in calorific value.

- Reciprocating stroke grate combustor, operated by a hydraulic system having three zones of each for drying, combustor and de-slagging purposes. This grate is driven by a Hydraulic system with suitable pressure and hydraulic cylinders are used to operate the complete grate system.
- The combustor and refractory is designed to retain 950 Deg. C for 2 seconds at furnace as per SWM rules 2016.

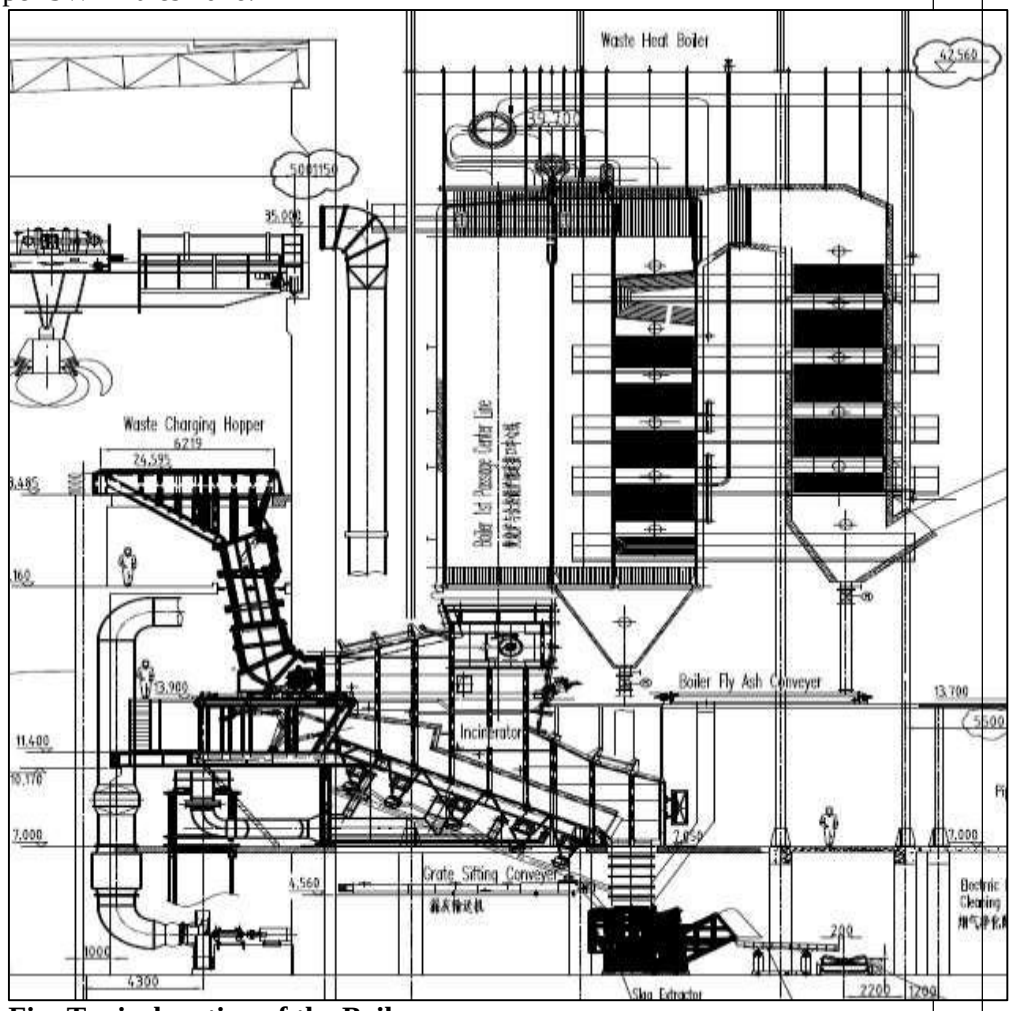


Fig: Typical section of the Boiler

Steam Generators and Auxiliaries:

The steam generator will be of Single drum, Natural circulation, balanced draft, two pass furnace design with water cooled membrane walls. Due to the nature of the SWM, all the heat transfer coils will be arranged in the third pass. The boiler will be designed for outdoor installation.

The grate will be a reciprocating step grate, which is one of the critical equipment in the steam generator system. The furnace residence time will be designed such that, the dioxin and furan emissions are within the specified limit of the pollution control board

There will be three (3) stages of super heater assembly with two (2) inter stage De-super heater, to control the super heater temperature. Economizer is considered as the back end heat recovery equipment. Following figure shows the general cross section of the boiler, starting from the fuel pit to the chimney.

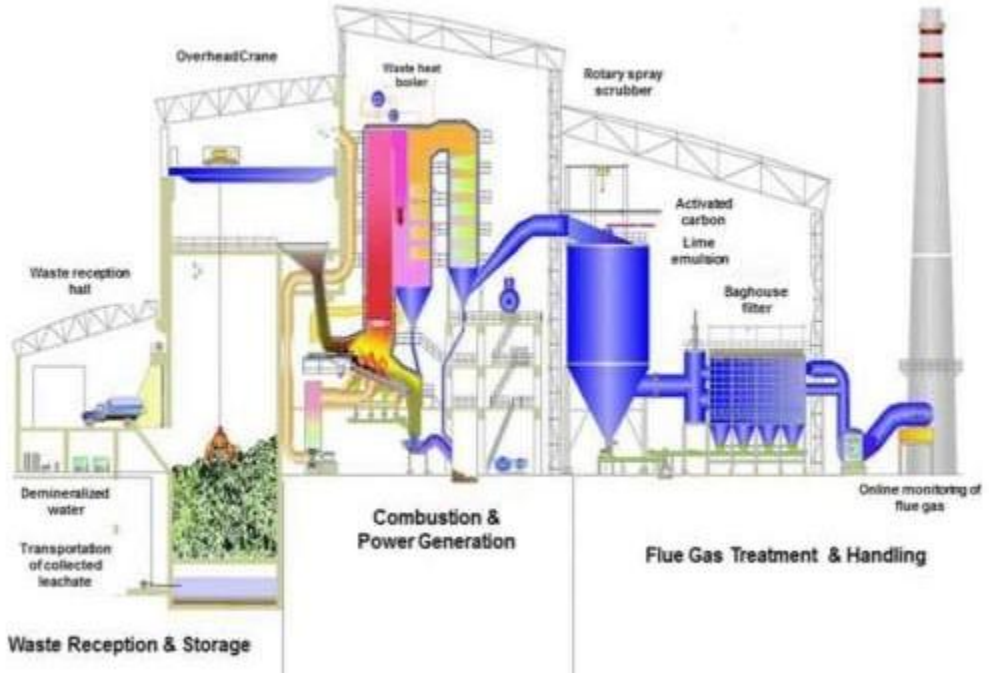


Fig: Typical arrangement of Waste to Energy Boiler

Design Parameters:

Super heater outlet pressure	:	45 bar (a)
Super heater outlet temperature	:	400 ± 5^0C
Feed water inlet Temperature	:	130^0C
Excess air Percentage	:	50 to 70%
Boiler Design Code	:	IBR

SELECTION OF POLLUTION CONTROL EQUIPMENT TO CONTROL THE EMISSION (FLUE GAS CLEANING SYSTEM):

Reduction of Acid Gases:

Flue gas cleaning system is envisaged for reduction of acid gases. In this process, the adsorption agent added to the flue-gas flow is lime. Lime is used to neutralize the acid potential in the flue gas.

Dust Removal:

The selection of gas cleaning equipment for particulates from the flue-gas is mainly determined by:

- Particle load in the gas stream
- Average particle size
- Particle size distribution
- Flow rate of gas
- Flue-gas temperature
- Compatibility with other components of the entire FGT system
- Required outlet concentrations.

Bag Filter:

Filtration efficiencies of bag filters are very high across a wide range of particle sizes. Compatibility of the filter medium with the characteristics of the flue-gas and the dust, an d the process temperature of the filter are important for effective performance.

Fig: Typical arrangement of a bag filter

The acid gas is reacted with lime and heavy metal and dioxins are absorbed by active carbon . Bag filter, used for this project as the dust emission control equipment, has collection effici encies exceeding 99% for the fuel under consideration.
All the factors will be considered for designing the flue gas treatment system technically t o meet the emission norms of SWM Rules 2016.

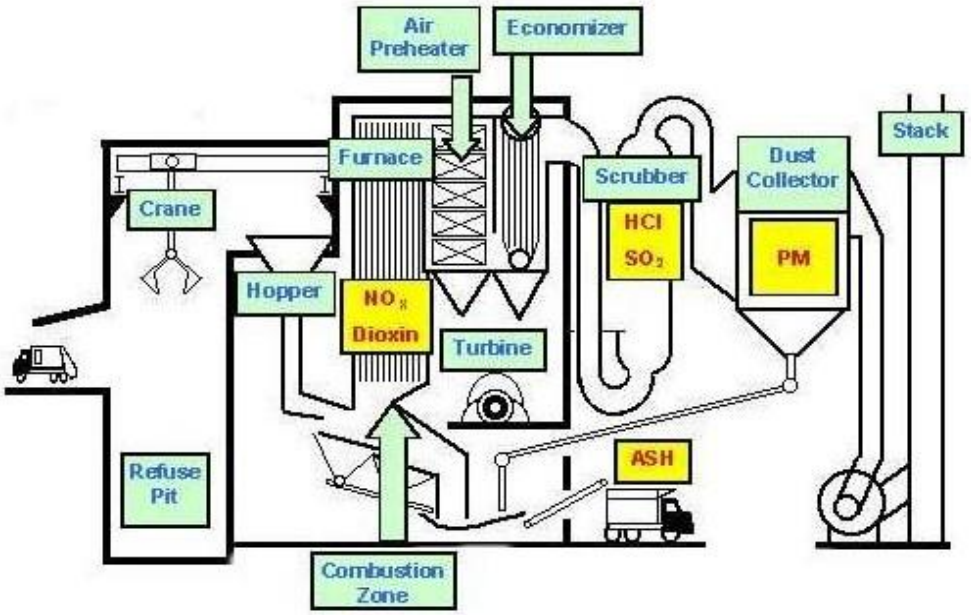


Fig: Typical representation of W2E Boiler

Combustion Residues Handling System:

- A good system for handling of the ash from the boiler ash outlets to the disposal p int is required in order to eliminate the pollution hazard to the plant with the ash.
- The residues handling system proposed for the reciprocating grate boiler is a mech anical residues handling system. The furnace bottom residues, at high temperature, are cooled by quenching of the residue in the slag extractor system.
- The residues from other outlets like economizer, Bag filter will be at lower temper atures and hence directly fed into the screw / scrapper / dense phase system.
- Effective storage volume of fly ash storage silo shall be suitable with respect to he ash generated in the boiler. Ash silo will be provided with side sheeting (Galvalum cor ugated sheet) from silo conical portion and up to above one (1) meter level from ground to avoid dust nuisance.

Waste Handling Crane with Grab: -

- Two cranes with 3 grabs are envisaged (2 grabs connected to cranes and 1 grab as spare) for higher availability to feed the waste to the boilers. One crane is to feed the w aste to feed hoppers and other one is used for homogenous fuel in the waste pit. Howeve r, the number of Cranes can be optimized during detailed Engineering. This is only indi cative.
- The crane is remotely controlled from the Crane operators cabin located in the c ontrol room slightly higher level than the feed hopper.
- The waste grab crane is equipped with a weight measuring system to record the waste flow transported to the feed hoppers. The grab is selected based on its suitabil ity for handling the waste.

Turbo Generators and Auxiliaries: -

- The Turbo generator capacity is arrived based on the actual steam quantity avail le to generate power, with required margins to take care of the VWO conditions of the T and to meet various operating and upset conditions of the power plant.
- The turbine will be an extraction cum condensing machine. The steam required f or the de-aerator and SCAPH is taken from the bleed of the turbine / Steam Drum. A CC is identified as the condensing equipment.
- The Power plant cycle will be provided with a de-aerator serving the dual purpose of de- aerating the feed water as well as heating the feed water with the bleed steam drawn through the turbine. The de-aerator considered is a fixed pressure type.
- The feed water temperature at the outlet of the de-aerator is around 130°C. The steam pressure at the turbine exhaust will be 0.16 bar(a).
- The feed water management program shall ensure the supply of good quality mak e up water to the system. In the proposed power cycle, from the steam supplied to the tu bine, about 98% will come back as the condensate from the ACC to the steam ge erator, through the feed water heating system (De-aerator).
- The make up for the cycle will be added in the condensate storage tank (CST) a nd the quantity of makeup will be controlled by the CST level control system.
- The power generation will be at 11 kV level. After meeting the power plant i nternal consumption, the remaining power will be exported to the grid.

A. Design Parameters

TG Capacity (Installed)	:	36 MW – 40 MW
Turbine inlet steam pressure	:	42 bar (a)
Turbine inlet steam temperature	:	395 ± 5^0C
Number of Turbine bleeds	:	One (1)

		Exhaust Pressure	:	0.16 bar(a)
		Condensing temperature	:	Wet, Saturated
		Type of Condenser	:	ACC
		Bleed Pressure	:	8.0 bar(a)
		De-aerator outlet temperature	:	Around 130^0C
		Power Factor (lagging)	:	0.80
		Generation Voltage	:	11.0 kV
		System Frequency	:	50 Hz + 5%

This will vary depending on the site available so as to optimize the resources to maximi ze the land utilization and disposal of waste to best resource utilization.

B. Air cooled Condenser

The heat sink selection should be initiated in the early stages of the project developmen t. The elements that significantly affect the selection of the heat sink option in a power plant inclu e the following:

- Availability and quality of water throughout the year.
- Change in water characteristics, due to change in ambient conditions and se asonal variations
- Disposal of water

Once the heat sink has been selected, its performance is optimized based on historical w eather data for the wet authority and dry authority temperatures at site. Equipment design para meters such as approaches are then determined in order to achieve maximum cycle efficiency at the optimum cost.

It was proposed to install an Air cooled Condenser considering the Water availability & Water conservation. The advantage of this system is, minimal or no issues associated with blow down, disposal of water and plume formation. A typical arrangement of ACC is shown below

Air cooled condensers must be placed close to the turbine building to minimize the pressu e drop between the steam turbine and the Condenser, reducing the steam duct cost and improvi ng the cycle efficiency.

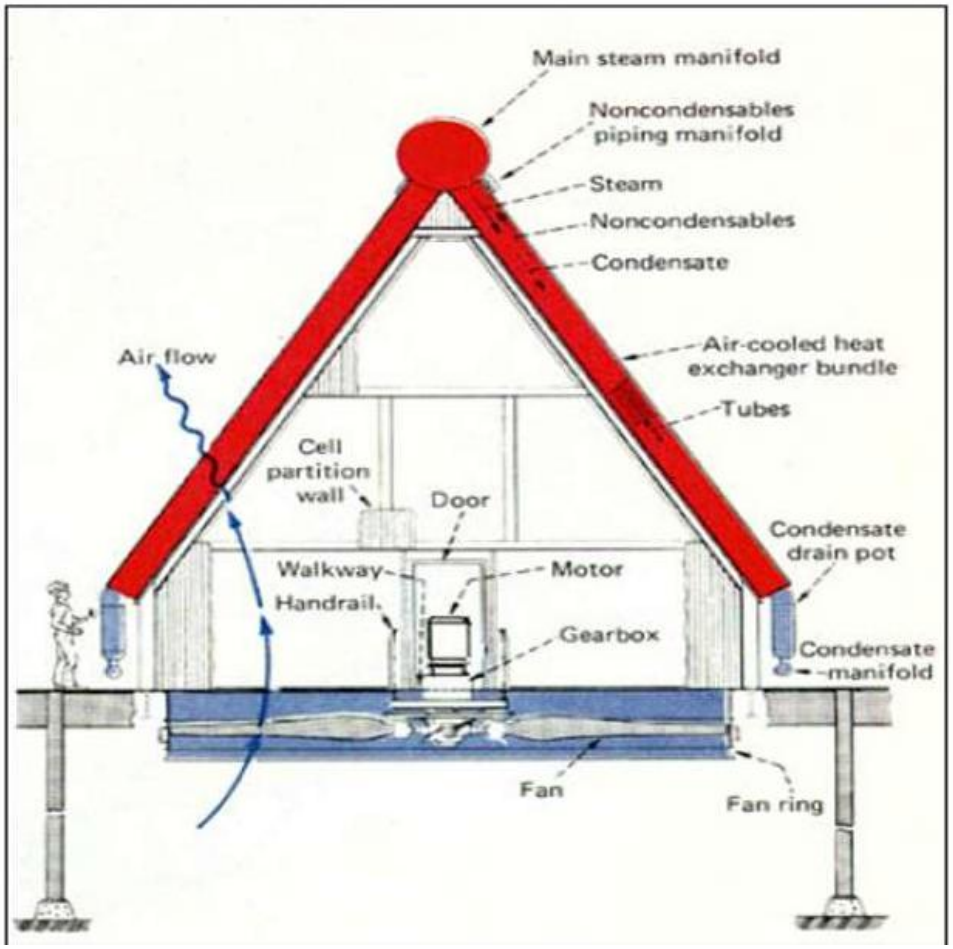


Fig: Typical Arrangement of Air cooled Steam Condenser of A- frame design

Design Parameters:

ACC Operating pressure	:	0.16 bar(a)
ACC steam temperature	:	57.8^0 C
Variation in the operating pressure	:	0.22 to 0.12 bar(a)
Number of ACC cells	:	8 appx
Number of condensate Ext. pumps	:	2x100%
Number of hot well pumps	:	2x100%

EOT Crane:

One (1) no EOT crane will be provided in the TG Hall for maintenance purposes suitab le for lifting the single heaviest component of the turbo generator.

Main hook capacity of TG hall EOT crane will be selected to lift the single maximum we ight of the Turbine Generator's component. Duty class of TG hall EOT crane will be M5 as per IS 177

Air Compressor Package

- Bag filters will be provided with instrument air (moisture free) to avoid choking . The capacity of the instrument air compressor & dryer will be sized accordingly.
- Type of compressor will be "Water cooled Oil free screw compressor" for instr ument & service air.

- Material of construction (MOC) of air receiver shall be SA515 Gr.70 / SA516 Gr.70 with corrosion allowance. Air receiver will be sized as per IS:7938.
- Capacity of instrument & Service air compressors (common compressor) for will be approx. 1750 N.cu.m/hr. total 2 nos. (1W+1S). Two nos. of air receivers w ill be provided. One no. for instrument air & one no. for service air equipment.

Cooling Tower

- Since the type of condenser is air cooled (ACC), the cooling tower will be sized only for the cooling water requirement of auxiliary equipment.
- Type of cooling tower will be mechanically induced draft, counter flow type, Pul truded FRP construction with film type fills.
- Capacity of cooling tower shall be min 550 cu.m/hr (per cell).
- Cooling tower shall be of 2 x 100% capacity (one working and one standby).

Centrifugal Pumps for Balance of Plant (BOP)

MOC of Auxiliary cooling water (ACW) pumps, cooling tower make up water (CT W) pumps & raw water transfer (RWT) pumps shall be as follows.

- Casing : CI FG-260
- Impeller : Bronze
- Casing wear ring : Bronze
- Shaft : Carbon Steel
- Shaft sleeve : SS 410 H
- Base plate : SA 36
- Gland Packing : Non-asbestos

MOC of DM water transfer pumps and Effluent transfer pump (ETP) shall be as fo llows.

- Casing : CF 8M / SS 316
- Impeller : CF 8M / SS 316
- Casing wear ring : SS 316
- Shaft : SS 316
- Shaft sleeve : SS 410 H
- Base plate : SA 36
- Gland Packing : for DMWT & CTMW – Mech Seal

Fire Fighting System:

- The Firefighting system including Fire hydrant system, Automatic fire detecti n and alarm system, Portable fire extinguishers, Automatic high velocity water spray s ystem, Automatic medium velocity water spray system, Automatic gas detection and alarm system, Remote operated water monitors (swivel type), manual operated foam sy stem and Sprinkler system based on required of the entire plant.
- Remote operated water monitors for SWM pit for quenching of fire.
- Automatic gas detection system will be provided for SWM pit & Leachate pit area
- Automatic addressable type Fire detection & alarm system will be provided for Ele ctrical & Instrumentation rooms.
- Portable fire extinguisher system will be provided for Electrical & instrumentation r ooms.
- Automatic Medium Velocity water spray system shall be provided for the cable ga lery.
- Manual operated foam system and Automatic Medium velocity water spray syste m both shall be considered for LDO tank Fire protection system.
- The Fire Protection system for the office shall be Portable fire extinguishers.

Elevators:

Total Two (2) nos. of passenger elevators (Lift) (one for SWM crane operating cabin and f or TG building to access various floors) will be provided.

All the Technical specification and information specified above will be finalized during detailed engineering after award of contract.

Chimney:

Chimney for the proposed power plant will be designed as RCC structure (parallel or conical RCC type). The height of the chimney is approximately 60 meters. Design and detailing of the chimney shall be as per the recommendation of IS: 4998 & IS: 6533.

The location and detail of the sampling ports for Nox, So_x and SPM analysers shall be provided on the chimney shell as per Pollution Control Board requirements. Sampling port minimum diameter shall be 100 mm.

- The entire inside and outside surface of RCC chimney shall be painted as per International Civil Aviation Organisation (ICAO) regulations. The external surface of the RCC chimney, as per statutory regulation, shall be painted in alternative bands of red and white for aviation warning during daytime.
- Concrete shells shall be designed with M25 or higher grade of concrete of thickness varying uniformly over height.
- Aviation warning lighting systems shall conform to the requirement of the latest applicable rules of ICAO and NAA / DARA regulations. Necessary platforms and ladders shall be provided to access the same.

Electrical Systems:

- All equipment shall be suitable for rated voltage of $\pm$10% and frequency of 50 Hz with $\pm$5% variation and 10% (absolute sum) combined voltage and frequency variation.
- The generator shall be of synchronous type with brushless excitation system and shall be designed for rated voltage & frequency of 11 kV & 50 Hz, with corresponding variations of $\pm$10% and $\pm$5%. The generator shall have a closed circuit air cooled system with external water cooled circuit (CACW cooling) and the windings shall have class 'F' insulation, with temperature rise limited to class 'B' insulation limits, under specified ambient air temperatures.
- Generator protection relays with redundancy configuration shall be provided in the generator protection panels. Refer plant single line diagram for the complete protection of the generator.
- 11kV HT switchboard with incoming and outgoing feeders shall be provided for connecting the Generator, plant distribution system and also for import/export of from/to grid.
- All the auxiliaries of the power plant shall be connected at 415 V by providing distribution transformer/converter transformers. The generated power, after meeting auxiliary loads, will be exported to the grid.
- VFD shall be provided for the pumps and fan motors, ACC.
- All the VFD loads shall be connected to converter duty transformers to mitigate the harmonics generated from drives and all non VFD loads shall be connected to distribution transformers.
- Standby tariff meter (Outdoor type) shall be provided in the plant end substation for recording the power import/export from /to the state grid. This stand by tariff meter shall be used as a reference meter for the power exported/imported to/from the grid.

- Emergency DG set shall be provided within the plant, to meet the emergency loads of the power plant. However, gird supply shall be used for power plant startup.
- The nominal voltage of the main DC system for protection & control systems, turbine emergency oil pumps and emergency lighting shall be 110 V.
- All motors shall be of energy efficient type. The windings will be insulated by class `F' insulation material and maximum rise shall be limited to class 'B' insulation limit over an ambient of 45°C.
- Earth fault current of the generator shall be limited to 50A for 10 sec.
- Earthing Transformer along with NGR panel shall be provided at 11kV system and shall be interlocked with 11kV Generator breaker. 11kV NGR of the Earthing transformer shall be switched whenever power is imported from the grid, with TG set in off condition.

Instrumental & Control System:

The Instrumentation and Control system, based on DCS philosophy, will be designed to provide monitoring and control capabilities to ensure safe and reliable operation, minimize operator manual actions and alert operators on any conditions or situations requiring manual intervention in a timely manner. The control functions shall be backed up by interlocks and safety systems which cause pre-planned actions like tripping or sequential shut down of equipment during situations where unsafe conditions develop faster than the controls or the operator's reaction time. All I&C equipment will be of proven design and will be selected to achieve the highest level of plant availability and facilitate equipment maintenance.

Signals of various process parameters shall be electrical signals generated by field mounted electronic smart type transmitters. The above signals will be processed in the DCS to produce electrical signal outputs, which will control the final actuators through converters. All computation, signal conditioning and control function generation will be done in the DCS.

Balance of Plant Design Conditions will be finalized by the Concessnaire During Detailed Engineering at the time of Project Establishment.

The modern sanitary landfill is considerably more than just a landfill or an open dump. This is because waste materials in the sanitary landfill are treated in a more controlled manner in order to protect the quality of groundwater in the vicinity. Lighter materials are deposited near the bottom of the sanitary landfill, where the majority of dangerous substances are buried, safeguarding the surrounding ecosystem. Approximately 37% of waste is disposed of globally in a landfill, with 8% of that going to sanitary landfills with landfill gas collection systems.

The overall objective of the landfill will be to minimize the impacts on the environment such as prevention of pollution of groundwater, control of odour, restricting the generation of leachate through well controlled operational techniques. Performance standards for landfill operations are listed below and the same would be complied by us during the operations period

Operation Monitoring- Landfill

The consortium has in-house expertise in designing, operation and maintenance of landfill operations for hazardous waste and Municipal Solid Waste rejects after processing. Further the consortium has a specific technical tie up with various international landfill material suppliers for supply of geo membrane and other critical components for landfill construction. The consortium has pioneering experience in the field of land filling and stringent in-house standards are developed for effective implementation of QA procedures.

Landfill monitoring is critical to the operation of a landfill. The commonly monitored parameters are:

1. Leachate head on liner
2. Leakage through the landfill liner
3. Ground Water quality
4. Ambient air quality (to ensure compliance with the standards)
5. Stability of final cover

Rejects disposal to landfill

- Layer of waste or rejects shall be of 300 mm thick and should be compacted to at least 2/3rd of thickness
- Daily cover shall be of 10 cm using C & D Debris or fine gravel etc.

The compliance of performance standards shall always conform to SWM Rules 2016.

Ground water Quality in the monitoring wells

COD and BOD are not to exceed 5% of the baseline values. There should not be any significant change in the parameters like Colour, TDS and Electrical Conductivity with respect to the baseline conditions.

Table 1 Groundwater standards

Sl. NO.	PARAMETER	STANDARD	UNITS
1	Arsenic	0.02	mg/l
2	Cadmium	0.01	mg/l
3	Chromium	0.05	mg/l
4	Copper	0.005	mg/l
5	Cyanide	0.05	mg/l
6	Lead	0.05	mg/l
7	Mercury	0.001	mg/l
8	Nickel	-	
9	Nitrate as NO_3	10.0	mg/l
10	pH	6.5-8.5	
11	Iron	0.3	
12	Dissolved solids	500	mg/l
13	Chlorides	250	mg/l
14	Sulphate (as $CO_{3)}$	200	mg/l
15	Zinc	5.0	
16	Phenolic Compounds (as C_6H_5OH)	0.001	mg/l
17	Total hardness (as $CaCO_3$)	250 or lower	mg/l

Odour

- Foul odour should not emanate outside the boundary of the site
- The concentration of gases like Carbon monoxide and methane shall comply with prescribed standards in the SWM Rules 2016

Environmental Standards

The ambient air quality parameters are prescribed for Solid waste management projects where SWM is processed. The applicable standards are reproduced briefly hereunder. A full-fledged Environment, Health & Safety (EHS) department will be in place for compliance with the standards as prescribed in this regard.

In order to ensure the optimal performance of the landfill site, checking the Environmental pollution and complying with the regulatory requirements is essential. The following environmental parameters shall be monitored on a regular basis.

- Quality of Leachate after Treatment
- Surface Water Quality
- Ground Water Quality
- Quantity and Quality of Gas Generated
- Ambient Air Quality

The above parameters shall be monitored as per the standards stipulated in SWM Rules (Management & Handling) 2016.

The number of samples and location specifications for monitoring are furnished in the following table

Table 2 SAMPLING SPECIFICATIONS FOR ENVIRONMENTAL MONITORING

DESCRIPTION	SAMPLING SPECIFICATIONS
Quality of Leachate after Treatment	One grab Sampling at outlet of the treatment plant every month
Surface Water Quality	One grab sample at the upstream side and one grab sample at the downstream side for water bodies near the landfill site every month
Ground Water Quality	One sample at the upstream side and three samples at the downstream side of the landfill site every month
Quantity and Quality of Gas Generated	24-hour continuous stack monitoring at the selected vent on every month
Ambient Air Quality	48 hours continuous ambient air quality monitoring at one location in upwind and three locations in downwind directions every month

The leachate quality after treatment should meet the standards recommended by MoEF in Municipal Solid Waste (Management and Handling) Rules, 2016 and Presented in the table below:

Table 3 DISPOSAL STANDARDS FOR TREATED LEACHATE

S.NO	PARAMETER	STANDARDS (MODE OF DISPOSAL)		
		INLAND SURFACE WATER	PUBLIC SEWERS	LAND DISPOSAL
1	Suspended solids, mg/1, Max	100	600	200
2	Dissolved solids (inorganic) mg/1	2100	2100	2100
3	pH	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
4	Ammoniacal nitrogen (as N), mg/1	50	50	-
5	Total Kjeldahl nitrogen as N,mg/1	100	-	-

6	BOD in mg/1 (3 days @ 27°C)	30	350	100	
7	Chemical oxygen demand, mg/1	250	-	-	
8	Arsenic (as As), mg/1 max	0.2	0.2	0.2	
9	Mercury (as Hg) mg/1, max	0.01	0.01		
10	Lead (as Pb), mg/1, max	0.1	1.0		
11	Cadmium (as Cd) mg/1 max	2.0	1.0		
12	Total chromium as Cr, mg/1	2.0	2.0		
13	Copper as Cu, mg/1	3.0	3.0		
14	Zinc A as Zn, mg/1	5.0	15		
15	Nickel as Ni, mg/1	3.0	3.0		
16	Cyanide as CN, mg/1	0.2	2.0	0.2	
17	Chloride as CI, mg/1	1000	1000	600	
18	Fluoride as F, mg/1	2.0	1.5	-	
19	Phenolic compounds (C_6H_5OH) mg/1	1.0	5.0	-	

The groundwater quality within 50 m of the periphery of landfill site shall be periodically (as presented in the above table). Usage of groundwater in and around the landfill site for any purpose (including drinking and irrigation) is to be considered after ensuring its quality. The monitoring results of surface and groundwater quality shall meet the drinking water quality standards as presented in the table below.

Table 4 WATER QUALITY STANDARDS FOR SURFACE AND GROUND WATER QUALITY MONITORING

S.NO	PARAMETER	IS 10500: 1991 DESIRABLE LIMIT
1	Arsenic, mg/1	0.05
2	Cadmium (as Cd) mg/1	0.01
3	Chromium, mg/l	0.05
4	Copper as Cu, mg/1	0.05
5	Cyanide as CN, mg/1	0.05
6	Lead (as Pb), mg/1,	0.05
7	Mercury (as Hg) mg/1	0.001
8	Nickel as Ni, mg/1	-
9	Nitrate as NO, mg/l	45
10	pH	6.5 – 8.5
11	Iron, mg/l	0.3
12	Total Hardness (as $CaCO_3$), mg/l	300
13	Chloride as CI, mg/1	250
14	Dissolved solids, mg/1	500
15	Phenolic compounds (as C_6H_5OH), mg/1	0.001
16	Zinc A as Zn, mg/1	5
17	Sulphate (as SO_4), mg/l	200

Ambient air quality at the landfill site and at the vicinity shall be monitored as per the frequency given above to meet the prescribed standards as presented in the following table;

Table 5 AMBIENT AIR QUALITY STANDARDS

SL. NO	PARAMETERS	ACCEPTABLE LEVELS
1.	Sulfur dioxide	120 ⌈g/m ^{3} (24 hours)
2.	Suspended particulate matter	500 ⌈g/m ^{3} (24 hours)
3.	Methane	δ 25 % of the lower explosive limit(650 mg/m^3)
4.	Ammonia (24 hour average)	0.4 mg/m^3 (400 ⌈g/m ^{3})
5.	Carbon Monoxide	1-hour average: 2 mg/m^3 8 hour average: 1 mg/m^3

This schedule provides description of minimum technical specifications for various equipment expected to be used by the Concessionaire for execution of the project activity. The Concessionaire shall ensure that the technical specifications of the equipment to be used for the project should at least meet these technical specifications:

2. Conveyor with Dual Trommel: -

Feeder Conveyor (Preparatory Section)

Type: Chain Belt "Z" type conveyor with UHMW liners

Input: Digested Organic Waste

Output: Digested Organic Waste

Purpose: Feeding of digested city garbage

Power: Through Hydraulic Power Pack

Chain: Heavy Duty Steel Fabricated Roller Chain

Belt: Heavy Duty NR belt M 24 grade 3 ply 8 mm

Drive: Through Hydraulic Motor

Support: Steel Fabricated

Fabrication: Out of heavy rolled sections as

ISMC 100, 75, ISA 50, 45 along with .12 & 14 SWG s

Dimension: 900 x 8000

Dual Trommel

Type: Shaft less Rotary Screen

Input: Digested organic waste

Output: Material having oversize < 4 mm

Purpose: To screen out oversized inert & undigested materials

Power: Through Hydraulic power pack

Drive: Friction drive

Support: Steel fabricated

Fabrication: Main drum with lifters fabricated out of 10 mm thick HRC sheet with heavy duty angular reinforcement. Perforated screen with 25 mm holes fabricated out of 3 mm plate**.**

Dimension: 2000×5800

Feeder Conveyor of Refinement Section

Type: Chain Belt "Z" type conveyor with UHMW liners

Input: Fully digested and cured material having -16 /4 mm size

Output: Fully digested and cured material having -16/4 mm size

Purpose: Feeding of semi-finished compost for refinement

Power: Through electric power

Chain: Heavy duty steel fabricated roller chain

Belt: Heavy duty NR belt M 24 grade 3 ply 8 mm

Drive: Through electric motor, 2 HP, TEFC

Support: Steel fabricated

Fabrication: Out of heavy rolled sections as ISMC 100, 75, ISA 50, 45 along with 12 & 14 SWG sections

Dimension: 900×8000

Gravity Separator **Type:** Gravity Separator **Capacity:** Matching **Input:** Digested screened material below 4 mm size **Output:** Digested screened material below 4 mm size and free from heavy impurities such as sand, gravel etc. **Purpose:** To remove out heavy impurities such as sand, gravel etc **Power:** Through electric power **Drive:** Through electric motor, 3 HP & 2 HP, TEFC **Support :** Steel fabricated
Fabrication: Heavy base plate & links, out of heavy rolled sections as ISMC 75, ISA 50, 45 along with 12 & 14 SWG sections etc. **Dimension:** 1500× 900×1600
Aspirator Separator
Type: Centrifugal flow type with high efficiency cyclone **Capacity:** Matching **Input:** Fine dusty material from gravity separator **Output:** Fine dusty material **Purpose:** To entrap dusty material from gravity separator **Power:** Through electric power **Drive:** Through electric motor, 3 HP & 2 HP, TEFC **Support:** Steel fabricated **Fabrication:** sheet 12 & 14 SWG, out of heavy rolled sections as ISMC 75, ISA 50. Fan casing with anti-corrosion liners.

4. Excavator cum Loader: -

1	**General Descriptions**
	General: The Excavator Cum loader should be rugged and durable, and designed for ease of maneuverability and proper distribution of loader, and axle induced stresses. The frame/chassis should be either fully welded or rigidly bolted to achieve this, in accordance with the manufacturer's standard procedures. It should be suitable for working under adverse site conditions, and the powertrain should be designed for this purpose as 4 wheel drive.
2	**Basic Specification**
A	**Type:** Loader complete with 1.0m^3 front end loader bucket rear backhoe excavator with preferably. 0.3 m^3 bucket and minimum dump height of 2.6 m.

B	**Structure:** Rugged, durable and designed for durability and proper distribution of induced stresses.
C	**Engine:** Fuel efficient, 4 stroke, 4-cylinder, water cooled diesel engine. Minimum Gross Horsepower Rating : 76 HP (54 KW) at manufacturer's rated RPM
D	**Drive Train:** 4 wheel drive.
E	**Transmission:** Compact, fully synchromesh, with 4 speeds forward and 2 speed reverse.
F	**Differential and Axles:** The differential should be heavy duty, designed for use under severe operating conditions. The axles should be designed to withstand severe duty conditions at loading sites, and to perform continuous loading cycles with excellent maneuverability. The rear axle should be a rigidly mounted heavy duty drive axle, with torque proportioning differential for 2 wheel drive units. The front axle should be a heavy duty oscillating steer axle.
G	**Steering:** Full power, front wheel hydrostatic power steering with manual capability in the event of engine or hydraulic power failure.
H	**Brakes:** Main brakes. Self-adjusting, oil immersed, multi-disk, hydraulically actuated with independent left and right brake pedals. Parking brake: Hand operated.
I	**Hydraulic system:** Engine driven hydraulic pump with hydraulic tank mounted so as to ensure constant oil flow to the pump. System should be equipped with easily visible level read-out gauge and replaceable filter cartridge elements. System should operate at adequate pressure and flow at 2200 RPM.
J	**Electrical System:** 12 volt system with battery and alternator. Weather Protection, Water Proof and dust proof with heavy duty harness headLights. Front Working Lights: 2 halogen lamps. Rear Working Lights: 2 halogen lamps. Tail Light/Brake Lights: 2 each at rear end. Turn Signal Lights: 2 front 2 rear. Emergency Signal Flasher: 4-way. Reverse Alarm : 1 Number Plate Illuminators: Front and rear.
K	**Tyres:** Heavy duty for earth moving machines of suitable size as per manufacturer's standard.
L	**Operator's Cabin:** All steel welded safety cab conforming to Roll Over Protection (ROP) and Fall Over Object Protection (FOP) with safety glass mounted on rubber pads to eliminate machine vibrations. Accessible from both sides. **Interior:** Designed for ease of operation without undue fatigue. Features should include suspension seats, all-round visibility, easy-to-reach controls, rear view mirror, interior light, front windshield wiper and horn. **Controls:** Throttle, independent left and right foot brake pedals, parking brake, transmission disconnect pedal, hydraulic control levers, steering wheel, gear shift lever, turn signals, flasher, etc. **Instruments:** Bright read-out front and back consoles which include tachometer, hour meter, engine oil pressure gauge, fuel gauge, water temperature gauge, parking brake indicator, headlight indicator, alternator "no-charge" condition, etc. Audio-visual alarms for oil pressure, oil temperature, transmission oil temperature, transmission oil pressure, main battery etc.

M	**Loader Bucket:** Standard bottom dump clam 6 in one bucket suitable for dozing, digging, grading, filling, grabbing and loading capacity should be nominal 1.0 m^3.
N	**Backhoe Bucket:** Standard excavator type backhoe bucket suitable for digging, loading, dozing, grading, filling and grabbing. Size shall be nominal 750 mm width with preferably 0.3m^3 capacity.
O	**Capacity:** Max Digging depth (not less than 4.50M.) Break out forces from excavator bucket cylinder (not less than 5500 kg.) Break out forces from the excavator Arm cylinder (not less than 3000 kg.) Breakout forces from loader bucket cylinder (not less than 6000kgf.) Breakout forces from loader Arm (not less than 5000 kg.)
P	**Painting and Lettering:** Paint Process and Paint should be superior quality to ensure long lasting structure resistance to rust, weathering and breakage. Color shade should be the Purchaser's choice selected from the standard colors offered by the Supplier. The bidder should get the colouring paint/ name & slogan writing approved from the purchaser.
Q	**The Manufacturer/Supplier should provide following with each vehicle :** Manufacturer's standard tools for maintenance with lockable security boxes. Operator's manual Workshop and service manual Spare parts catalogue Technical details, drawing and operation manual Warranty card for one year Battery warranty card for 1 year
R	**Warning System and Essential Accessories:** Digital Hour meter; tachometer; Fuel gauge; water temperature gauge; Engine oil pressure gauge with warning light Ammeter supported with warning light Horn- 2 pieces; External rear view mirrors Radiator protection grill; Head and tail lights, cabin lights, reversing light and traffic indicator; Spare front & rear (one each) wheel with tyre and inner tube; Jack and wheel wrench; Anti-theft steering lock; Full power front wheel hydrostatic power steering with manual capability; Seat belt, front screen wiper, hazard warning system and helper seat; Speedometer; Radio of standard make.

8. Weighbridge 50 MT Capacity:

1. Machine
Type: Static, fully electronic, load cell based. pit less fully floating design **Capacity:** 50 MT with least count of 5 Kg **Platform size:** 12000 × 3000 mm with necessary ramps **Steel Structure:** The steel structure should be based on bidders own design. Top of the structure should be of 12 mm thick MS sheet with adequate design having anti-skid surface.
2. Load Cells Details

No. of Load Cells: 06
Type: GD Rocker Pin Design with Hexagonal End Counterforce (Load Pin) for Anti-Rotation **Output:** digital with response time of digitizer 0.1 second
Accuracy: OIML, 10000d Class III –L, viz.; 0.010% of Rated Capacity Rated
Output Sensitivity: 2 mV/V
Output Update: 10 reading per second
Non Linearity: < +/- 0.017 % of Rated
Output No Repeatability: < +/- 0.010% of Rated Output
Overload Rating: > 300% of Rated Capacity
Protection Class: Min. IP 68 (submerged in water at 1.5m. depth for 10,000 hrs.

3. Electronic Display Unit	
A	**Type of Display :** Min. Dual Display, Vacuum Fluorescent, 7 digits
B	**Key Board:** 24 Position Membrane type, Tactile Feel 0 – 9 Keys Scale Function Keys Vehicle Management Software Function Keys
C	**Heights of Display :** 24 mm
D	**Date and Time :** Automatic calendar clock should be provided with the indicator with battery backup so that the time, date etc., does not change in case of failure of power
E	**Tare :** 100%
F	**Indicator :** 8142 PRO + Terminal
G	**Standard Interface:** 2 Nos. RS232, 1No Rs422/485 1No. CL 0-20 ma 1 No. Parallel Centronics Interface Host Interface
H	**Password Protection:** should be available
I	**Inbuilt Vehicle Management Software:** Stores Min.1000 transaction & 500 Trucks ID Daily Report Min.4 Print Ticket Format Truck ID, Client ID, Cargo ID
J	**Memory Capacity:** Min. Program Memory 64K Min. Data Memory 32K
K	**Scale Functions:** Push Button Tare Keyboard Tare Tare interlock, Automatic Tare & Clear Function Centre of Zero indications Auto Zero maintenance Motion Detection & indication Expanded Weight Display Real-time Clock by Battery Backup
L	**Calibration:** Through software only with Hardware & Software Protection facility.
3. General	
Fully electronic with P IV computer, colored monitor 15", 80 column matrix printer, communication, necessary software as per the requirement, additional remote display unit, 5 KVA UPS with 8 hour battery backup.	
4. Civil Works	
All civil works for installation of weighbridge such as foundation, ramps etc. except weighing record room shall be done by the supplier within the quoted price certified by Independent Engineer.	
5. Warranty	
The equipment should have a minimum warranty of one or three year including the warranty for load cells.	
6. Stamping	

The supplier will get the stamping done of the weighbridge from the Weights & Measure department of Government of West Bengal/, initially as well as every year during the warranty period. The cost of calibration shall be borne by the Concessionaire.

Overall length:	5375 mm
Width:	2140 mm
Loading platform area:	7.5 sq.
m. Loading capacity:	3.2 MT
Eng. BHP:	71

9. Dead Animal Pick Up Van

Trommels and Conveyors: -

Components		**Technical Specifications**
Trommels	**Main Structure**	*Plate 10 mm ISMC 150, 100, 75 Etc. as per IS 801.*
	Dust covers (Screen)	*Anti-Corrosion Alloy Steel with up to 120mm punch*
	Material of Construction	*Steel plates & Structural –IS:2062, Tensile Strength – 299,UTS – 45*
	Bearings	*NTN, Heavy duty sealed bearing, maintenance free*
	Motor	*LSHT Hydraulic (SAI), 500 cc RP motor*
	Drive	*Friction Drive*
Conveyors	**Main structure**	*Plate 10 mm ISMC 100, 75, ISA 50 etc.*
	Material of Construction	*Steel plates & Structural – IS : 2062, Tensile Strength – 299,UTS – 45*
	Bearings	*NTN, Heavy duty sealed bearing, maintenance free*
	Motor	*LSHT Hydraulic (SAI / EATON)*
	Gear Box	*Bonfiglioli, Elecon*
	Chain	*Bushed & Roller chain (MVM76 mm & 62.5 mm pitch double stand transmit positive power, 98% efficiency for all working loads under well lubricated condition.*
	Drive	*WGR / Shaft mount SGR*
	Belt	*Tension based on IS 11592/CEMA Three Ply Nylon Belt (2mm Rubber & Bottom 1.5 mm Thick Rubber Coating 3 ply means three-liner sheet joined together*
Paint	**Drive**	*Electric*
	Cleaning	*Chemical / Abrasive*
	Primer	*Epoxy Paint*
	Top Coat	*Enamel Paint*

All design parameters of all processing plants must meet the industrial establishment norms, in addition to standard design norms of Mechanical, Electrical, civil, HVAC, BIS, IS codes, Power Transmission norms and any other standards if not available in these standards. Selection of the design at the discretion of the concessionaire, however the prior approvals from the authority is required.

SCHEDULE 24 - GENERAL TECHNICAL SPECIFICATION FOR VEHICLES

(As and where required)

1. BOV Bins:

Sl. No.	Description	Specification
1	**Bin Top O.D**	**Dia 470 mm**
2	**Bin Top I.D**	**Dia 420 mm**
3	**Bottom O.D**	**Dia 352 mm**
4	**Bottom I.D**	**Dia 347.50 mm**
5	**Height O.D**	**535 mm**
6	**Height I.D**	**527 mm**
7	**Volume**	**60 Liter**
8	**Lid O.D.**	**Dia 480 mm X 75 mm Height**
9	**Tolerance All Dimension**	**+/ - 2 mm**
10	**Raw Material**	**HDPE**
11	**Load Bearing Capacity**	**Approx. 30 – 35 Kgs**

2. Community Bins (1.1 m3):

Sl. No.	Description	No's
1	SIDE GI SHEET 2 MM THK	4
2	TOP GI SQUARE PIPE 32 X 32 X 2 MM	4
3	BOTTOM GI SHEET 2 MM THK	1
4	WHEEL BRACKET GI SHEET 3 MM THK SIZE	2
5	HANDLES MS ROUND 16 MM	2
6	LIFTING PINS MS ROUND 36 MM	2
7	MS WASHER DIA 70 MM	2
8	BOTTOM HOLES 12 DIA	4
9	200MM NYLON WHEELS WITH 5MM BRACKET	4
10	SIDE LIFTING ROD SHEET 3 MM THK	2
11	TOP LID 1.2 MM SHEET	1
12	TOP LID HINGES 50 X 50 MM	3
13	TOP LID HANDLE 12 MM	1

3. 16 Cum. Compactor Bins:

1	**BODY (Shell)**	
a	**Side**	**ST 52 /IS 2062 E350 GRADE SHEET,**
b	**Roof**	**ST 52 / IS 2062 E350 GRADE SHEET**
c	**Flooring**	**ST 52 / IS 2062 E350 GRADE SHEET**
d	**Rails**	**I BEAM 175X85**
e	**Flooring Cross Member**	**PRESSED SECTION**
2	**HEAD(Compaction Chamber)**	
a	**Side**	**ST 52 / IS 2062 E350 GRADE SHEET**
b	**Flooring**	**8MM HARDOX/QUARD 450/400 GRADE SHEET**
3	**EJECTOR**	
a	**Front Plate**	**ST 52 /IS 2062 E350 GRADE SHEET**
4	**Body Shape**	**Square in shape with stiffeners on side &top to reduce to reduce material stress and avoid deformation due**
5	**Body design**	**Taper in length wise for proper compaction**
6	**Body Volume in Cum**	**16 cum**
7	**System of bin Loading**	**Front Loading with Pin-Gear drive mechanism**
8	**No. of Hyd Cylinders for bin lifting**	**2nos**
9	**Compaction density t/Cum**	**0.85**
10	**Pressure (BAR)**	**180-240 BAR**
11	**Power (kW)**	**7.5kW**
12	**Electric Motor (V)**	**3 phase 415V AC,50Hz**

4. Battery Operated Vehicle (BOV):

Variant	**Pickup**
Vehicle category	**e-cart**
Payload – kg	**348**
Volume	**NA**
Vehicle Dimensions & Weight	
Dimensions – Length x Width x Height – mm	**2794 x 996 x 1765**
Wheelbase – mm	**2166**
Ground clearance – mm (Un laden)	**133**
Wheel track – mm	**835**
Turning radius – m	**3.75**
Vehicle kerb weight – kg	**317**
Vehicle GVW – kg	**665**
Cargo Tray Size – Length x Width x Height (inside dimensions) – mm	**1273 x 923 x 278**
DV Box Size – Length x Width x Height (inside dimensions) – mm	**NA**
Flat Bed Size – Length x Width x Height (inside dimensions) – mm	**NA**
Performance	
Top Speed – km/h	**24.5**
Certified Range – km	**115**
Typical Driving range – km	**80**
Grade ability – degree	**7**
Battery	
Battery type, Voltage – V	**Lithium-ion, 48 V**
Battery capacity (installed) – kWh	**3.69**
Charging time at standard conditions	**2h 30 min**
Drivetrain	
Peak power – kW	**1.95**
Peak torque – Nm	**22**
Transmission type	**Rigid Axle with Motor**
Suspension & Brakes	
Suspension – Front	**Helical Spring & Hydraulic Shock Absorber**
Suspension – Rear	**Leaf Spring with Shock Absorber**
Brakes – Front/Rear	**Mechanical Brakes**
Parking brake	**Mechanical lever type**
Feature	
Windscreen & wiping system	✓
Spare wheel provision	✓
Driving modes – FNR (Forward, Neutral, Reverse)	✓
Economy & boost mode	✓
Lockable glove box	✓
12 V socket	✓
Telematics unit & GPS	**Optional**
15 A off board charger	**Optional**
Hazard indicator	✓
Reverse buzzer	**Optional**

Warranty	**3**

5. Auto Tipper with hopper fabrication

LMV (Auto Tipper chassis 2.1 GVW)

LMV Vehicle		
Sl. No	**Description**	**Specification**
1	Engine	2 Cylinders, 798 cc DI Engine
2	Max Engine Output	33 kW @ 3 750 r/min (44.25 hp.)
3	Max Torque	110 Nm @ 1 750-2 500 r/min
4	Max GVW	2120 kg
5	Payload	1000 kg
6	Overall Length	4282 mm
7	Wheelbase	2250 mm
8	Ground Clearance	175 mm
10	Min TCR	4.75 mts.
11	Steering	Type Electronic power assisted steering
12	Front Suspension	Parabolic Leaf Springs
13	Rear Suspension	Suspension Rear Semi-elliptical leaf springs
14	Front Brake	Front Hydraulic disc brake
15	Rear Brake	Rear Drum 254 mm dia. Rear with LCRV
16	Tyres	Tyre size 165 R14 8PR Size
17	Tank Capacity	Diesel Tank 35 L
18	DEF	10.5 Lts.
19	Seating Capacity	D+2

2.3 m^3 Hopper

Hopper Volume	2.3 m^3
Tipping Type	Hydraulic Tipping
Number of Cylinders for Tipping	1
Power Pack Spec	12v DC, Pressure 120 Bar
Power Pack Make	Dantal / Wipro
Hydraulic Cylinder Make	Dantal / Wipro
MOC	MS (IS2062)
Side Wall Thickness	1.6 mm (MS)
Bottom Sheet Thickness	2 mm (MS)
Box Section Thickness	2.5 mm (MS)
Hydraulic Tank Capacity	10 Liters
Painting	2 Coats of High-Quality Primer and 2 Coats of Enamel Paint on the outside and 2 Coats of Epoxy Paint inside of the tipper body.
Hazardous Waste Buckets	2 Nos - 20 L on each side (Red and Black)

6. 14 Cum. Compactors

Chassis Requirements:

1	Manufacturer/Model	Reputed Manufacturers like Ashok Leyland/TATA/Eicher/Bharatbenz etc
2	GVW	Min.16T
3	Max Power	180HP
4	Wheelbase	4350mm

5	Pump and PTO mounting	Directly coupled without any intermediate shaft

Note: All parameters of all processing plants and its vehicles must meet standard design norms of Mechanical, Electrical, Manufacturers specifications BIS, IS codes, RTO Norms, Bharat Stage Emission norms, Automotive Industry Standards (AIS), Emission standards as per the BSE norms and any other standards if not available in these standards also must meet.

SCHEDULE 25 - ENVIRONMENTAL SAFEGUARDS

Introduction

The environmental safeguard requirements and measures listed in this Schedule apply to all towns and project components including ISWM facility, Facilities, vehicles / equipment, etc., as proposed under the project, areas as described in Schedule 1.

The Concessionaire shall implement and operate the project in accordance with the following standards/references on environmental regulation and safeguards:

1. Municipal Solid Waste (Management and Handling) Rules, 2000/2016
2. *Draft* Solid Waste (Management and Handling) Rules, 2013 (if applicable at the time of bidding)
3. Relevant requirements/clearances of the Karnataka State Pollution Control Board (KSPCB)
4. Other applicable environmental regulation at the National, State and Local Level
5. Following International Finance Corporation (IFC) Performance Standards, 2012 (as required by DFID Environmental Policy and Safeguards)
    a. Performance Standard 1: Assessment and Management of Environmental Risks and Impacts
    b. Performance Standard 3: Resource Efficiency and Pollution Prevention
    c. Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
    d. Performance Standard 8: Cultural Heritage
6. IFC general EHS Guidelines and MSW Sector Guidelines (these requirements have been presented later in this document).

The Concessionaire may consider subscription to management standards such as ISO 14001 or OHSAS 18001 to better address the environmental and health & safety safeguards and compliance for site construction and management.

Environmental Statutory Compliance and Key Responsibilities

As per the national environmental regulation applicable in India, the Table 1 below specifies the key statutory requirements and primary responsibilities for ensuring compliance in the ISWM facility.

Table 1 Responsibility Allocation for Environmental Statutory Requirements: -

Sl. No.	Regulatory Requirement	Primary Responsibility
1.	Seeking and Renewing Authorization from Karnataka State PCB under applicable MSW Rules	Concessionaire
2.	Develop ToR and approve from SEIAA, Appointment of Consultant, Conduct of EIA and ensure Environmental Clearance from SEIAA:	Concessionaire
3.	Consent to Establish and Operate under the Air and Water Acts, and subsequent renewals from Karnataka State PCB:	Concessionaire
4.	Post EC Monitoring Report to State PCB/Authority	Concessionaire
5.	Annual Report to State PCB	Concessionaire
6.	Annual Report to WBPCB	Concessionaire
7.	Accident Reporting as per MSW Rules	Concessionaire

(Note: All mentions of KMDA to be read as "Authority")

Where the primary responsibility of a statutory compliance is with the Concessionaire, the Authority for respective locations will facilitate as necessary and provide relevant support to the Concessionaire in seeking / fulfilling above statutes.

While planning, designing and operating the ISWM facility, care should be taken to address the following aspects:

Clean-up of existing solid waste dump sites in all the towns in the ISWM Project so that this waste is also picked up and processed / disposed suitably at one of the ISWM facilities in the project or one of its components Proper capping / restoration of these dump sites (as applicable) as per provisions of MSW rules should be factored in the design and planning of the ISWM Project

The proposed sites where some solid waste exists as on date should be carefully studied for facility planning (including aspects such as natural drainage, topography etc.) and related infrastructure so as to accommodate space for dumping of existing solid waste, while constructing an engineered landfill area for sound disposal Access roads and pathways to reach the site should be considered and provide by KMDA to concessionaire for assessing environmental impacts and planning mitigation.

Maintaining proper buffer distance to the landfill site (as per applicable regulation and guidance from SEIAA) should be considered while planning so as to minimize impacts on surrounding land use Possibility of leachate leakages to downstream areas (nullahs, culverts or groundwater) around the site and possible mitigation measures should be addressed Suitable environmental monitoring programmes should be included in the operational plan

by the bidders so that environmental compliance and risks could be monitored and eliminated / mitigated over the life of the project. After getting the clearance for development of the project, no habitation and water bodies shall be developed surrounding the facility as per the CPCB guidelines and MSW rules.

Environmental Safeguard Measures to be adopted for Construction Phase:-

Table 2 below presents generic guidelines on environmental safeguards to be followed during the construction phase of the ISWM project.

Table 2 Guidelines for Environmental Safeguards during Construction Phase: -

Sr. No.	Project Activity	Prevention/ Mitigation Measure
1.	Site Clearance	**Fugitive Dust** Preserve existing vegetation where feasible. Limit the area of clearance to the area required immediately for construction. Use water for dust suppression.
		Top soil Management Strip and store the topsoil separately for reuse on embankments and landscaping. Cover the top soil stockpile with tarpaulin or any other suitable material.
		Protection of trees Preserve large trees on site Uproot and replant fully grown trees at other locations where feasible Trees which can be replanted in other areas should be uprooted with care. Compensatory tree plantation should be based on suitably designed tree plantation programs. For trees where canopy is trimmed, applying chemicals like copper sulphate in required quantities on the cut faces to inhibit sap loss, fungal attacks etc.
2.	Air Quality	Minimizing dust from material handling sources, such as conveyors and bins, by using covers and/or control equipment (water suppression, bag house, or cyclone) Minimizing dust from open area sources, including storage piles, by using control measures such as installing enclosures and covers, and increasing the moisture content Dust suppression techniques should be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements Selectively removing potential hazardous air pollutants, such as asbestos, from existing infrastructure prior to demolition Managing emissions from mobile sources Avoiding open burning of solid

3.	Soil Erosion	**Sediment mobilization and transport** Reducing or preventing erosion by: Scheduling to avoid heavy rainfall periods (i.e., during the dry season) to the extent practical Contouring and minimizing length and steepness of slopes Mulching to stabilize exposed areas Re-vegetating areas promptly Designing channels and ditches for post-construction flows Lining steep channel and slopes (e.g. use jute matting) Reducing or preventing off-site sediment transport through use of settlement ponds, silt fences, and water treatment, and modifying or suspending activities during extreme rainfall and high winds to the extent practical
4.	Water Bodies	**Disturbance to water bodies** Depending on the potential for adverse impacts, installing free-spanning structures (e.g., single span bridges) for road watercourse crossings. Restricting the duration and timing of in-stream activities to lower low periods, and avoiding periods critical to biological cycles of valued flora and fauna (e.g., migration, spawning, etc.) For in- stream works, using isolation techniques such as beaming or diversion during construction to limit the exposure of disturbed sediments to moving water. Consider using trenchless technology for pipeline crossings (e.g., suspended crossings) or installation by directional drilling. **Structural (slope) stability** Providing effective short term measures for slope stabilization, sediment control and subsidence control until long term measures for the operational phase can be implemented Providing adequate drainage systems to minimize and control infiltration. **Clean runoff management** Segregating or diverting clean water runoff to prevent it mixing with water containing a high solids content, to minimize the volume of water to be treated prior to release.
5.	Demolition	Use water for dust suppression on stacked debris Where feasible, plan for reuse and recycling of demolition waste. Dispose demolition waste in areas designated by the local authority. Install noise barriers around work areas

	6.	Use of vehicles, machinery and other equipment: Generation of Noise	Inform the neighborhood regarding the schedule of high noise Generating activities. For conduct of work near sensitive receptors like schools, Hospitals, consult the management regarding work schedules. Schedule construction activities to avoid noisy activities near forests and human habitation during the night Conduct noise generating activities between 6 am to 9 pm. Provide noise barriers at sensitive locations. Construction Equipment should restrict use of equipment emitting noise greater than 90 dB(A) Avoid use of pneumatic equipments like jack hammers that could cause loud noise near sensitive areas. Wedge and hammer or similar other techniques could be employed. Noise producing equipment like concrete mixers, generators, graders etc. should be provided with noise shields around them, effective in adequate attenuation of noise levels. Preventive maintenance of vehicles, equipment should be carried out to prevent noise generation from parts. Provide an impermeable flooring in the vehicle workshop. Collect waste oil through trays and store it separately. Reuse waste oil for shuttering. Dispose waste oil to MoEF approved recyclers. Install oil and grease traps to treat waste water from the workshop.
	7.	Noise and Vibration	Planning activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance Using noise control devices, such as temporary noise barriers and deflectors for impact and blasting activities, and exhaust muffling devices for combustion engines. Avoiding or minimizing project material transportation through community areas during peak hours Provision of mandatory acoustic enclosure /acoustic treatment of room for stationary DG sets (5KVA and above). The acoustic enclosure/acoustic treatment of the room should be designed for minimum 25 dB (A) insertion loss for meeting the ambient noise standards, whichever is on the higher side. The DG set should be provided with proper exhaust muffler with insertion loss of minimum 25 dB (A) Provision for stationary machines and equipment with acoustic enclosures and silencers.
	8.	Water consumption	Water for construction works should not be drawn from community water sources. Obtain permit for consumption of water during construction and operation of the facility. Obtain permission for bore wells and check the quality of water for construction and consumption. bore wells in water scarce/ drought prone regions. Check the bode well for leakages if any and fix them immediately. Cap the bore well after completion of construction.

	9.	Labour Camp	Provide dustbins to avoid littering. Provide a common cooking area with LPG connection. Provide adequate sanitation facilities based on the number of workers residing in the camp. Discharge domestic waste water into septic tank/ soak pit system.
	10.	Excavation and Earthwork	If feasible, reduce activities during windy conditions. Limit the area of excavation to immediate requirement. Use water for dust suppression on stockpiles and excavated areas. Closely monitor construction near water bodies to ensure that the excavated earth does not spill into them. Install hard barricades where required. Reuse surplus material for backfilling Provide for stormwater management within the site Provide silt traps in appropriate locations to de-silt the storm water.
	11.	Procuring Construction Material	Ensure that the material is obtained from approved quarries. Obtain permission from local authority as well as the owner of the land from which soil is being borrowed. Strip and store the topsoil for reuse on embankments, landscaping etc. Stormwater management around borrow areas Restoration of borrow areas to stop soil erosion
	12.	Transportation of material	All dumpers or trucks transporting construction material, soil and construction spoil should be covered with tarpaulin.
	13.	Solid Waste	Implementation of appropriate waste identification, segregation and disposal protocols and procedures Manage construction site waste through recycling. Grinding of removed, old surface material and reuse in paving, or stockpiling the reclaim for road bed or other uses. If not recycled, it should disposed in a sound manner avoiding spillage of construction material, dumping of construction/excavation spoil on water bodies or obstructing normal flows during construction All the waste generated from the labor camps should be collected, stored and disposed in environmentally suitable manner
	14.	Hazardous Materials	Providing adequate secondary containment for fuel storage tanks and for the temporary storage of other fluids such as lubricating oils and hydraulic fluids, using impervious surfaces for refueling areas and other fluid transfer areas Training workers on the correct transfer and handling of fuels and chemicals and the response to spills. Providing portable spill containment and cleanup equipment on site and training in the equipment deployment
	15.	Use of diesel generator sets and diesel powered vehicles	Conduct stack monitoring annually. Use enclosed type diesel generator sets with stack heights as recommended by CPCB conduct preventive maintenance as Manufacturer Operating Manual. Provide noise and vibration absorption pads at the base of the diesel generator set. Use an enclosed type diesel generator set.

	16.	Traffic diversion/ obstruction during construction	Traffic management and diversion plans should be prepared to avoid congestion in peak periods. Traffic diversions and alternate routes should be displayed along the road using signage. Working areas should be barricaded on existing roads and diversions should be demarcated with sign boards and soft barricades. Traffic marshals should be posted at high congestion areas.

Note: all rules, regulations and norms prescribed by the Environmental safeguard framework (ESSF) and policies from time to time issued by the concerned departments must be followed by the concessionaire at all times during the concessionaire period.

SCHEDULE 26 - GUIDELINE FOR SOCIAL SAFEGUARD

INTRODUCTION

This schedule is part of the Draft Concession Agreement (DCA) under the Request for Proposal (RFP) for ***"Integrated Solid Waste Management (ISWM) for Bengaluru Urban District Under DBFOT Model (Design, Build, Finance and Operate and Transfer) for 30 Years*** through the PPP model under the BSWML to address the social safeguard requirements for the project components as specified in Schedule 1

Avoidance of Interference: -

The Concessionaire shall not interfere unnecessarily or improperly with the access to and use and occupation of all roads, footpaths and any other property in the Project Area the Concessionaire shall indemnify and hold the Authority harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from any such unnecessary or improper interference

Secondary Waste Collection of Waste: -

Concessionaire shall establish and maintain storage facilities with support from AUTHORITY in such a manner as they do not create unhygienic and insanitary conditions around it.
A storage facility shall be so placed that it is accessible to users.
Wastes stored are not exposed to open atmosphere and shall be aesthetically acceptable and user- friendly.
Concessionaire needs to ensure that no bins or containers, wherever placed, shall not overflow with the waste at any point of time.
Bins for storage of bio-degradable wastes shall be painted green, those for storage of recyclable wastes shall be printed white and those for storage of other wastes shall be printed black;
Concessionaire shall ensure to train their sanitary workers to avoid manual handling of waste. If unavoidable due to constraints, manual handling shall be carried out under proper precaution with due care for safety of workers by regular use of required protective gears.

Transportation of municipal solid waste: -

Vehicles used for transportation of waste shall be properly covered so that the waste is not visible to the public, nor exposed to open environment preventing their scattering.

Concessionaire shall ensure that the vehicles engaged in waste transportation follow the permissible speed limits and other road safety norms.

ISWM Facility/ Facilities: -

The Concessionaire shall comply with all applicable safety regulations ISWM Facility/ Facilities shall be fenced/r hedged and provided with proper gate to monitor incoming vehicles or other modes of transportation. The ISWM Facility shall be well protected to prevent entry of unauthorized persons and stray animals. Further, the Concessionaire shall keep the ISWM Facility clear of unnecessary obstruction so as to avoid danger to these persons, Approach and other internal roads for free movement of vehicles and other machinery shall exist at the ISWM Facility. Utilities such as drinking water, bathing facilities, toilets for workers and lighting arrangements for operations at ISWM Facility when carried out in night hours shall be provided. Regular health inspections of workers at ISWM Facility shall be periodically made. The Concessionaire shall take care for the safety of all persons entitled to be on the Site, by ensuring the use of protective gears amongst sanitary workers, vehicle drivers, guard, gateman, while working and handling waste at ISWM Facility. Concessionaire shall provide hand gloves, high boots made of tough leather, goggles and masks to all workers for handling municipal solid waste.

Statutory Compliances: -

Engagement of Staff and Labor: -

Concessionaire shall make arrangements for the engagement of all staff and labor, local or otherwise, and for their payment and extending other facilities in compliance to the Applicable Law. The Concessionaire shall be encouraged, to the extent practicable and reasonable, to employ staff and labor with appropriate qualifications and experience from places not limited to but near to geography.

Rates of Wages and Conditions of Labor: -

The Concessionaire shall pay rates of wages and observe conditions which are not lower than the minimum wage as notified by GOK time to time

The Concessionaire shall inform their personnel about their liability to pay personal income taxes in respect of such of their salaries, wages, allowances, and any benefits as are subject to taxes under the Laws of the Country for the time being in force, and the Concessionaire shall perform such duties in regard to such deductions thereof as may be imposed on him by such Laws.

Persons in the Service of Employer: -

The Concessionaire shall not recruit, or attempt to recruit, staff and labor from amongst the Authority's Personnel or shall seek approval from the Authority if the concessionaire desires to do so.

Labor Laws: -

The Concessionaire shall comply with all the relevant labor Laws applicable to the Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.

The Concessionaire shall require his employees to obey all applicable Laws, including those concerning safety at work and shall do needful for the compliance of Concessionaire shall follow and implement all statutory provisions on labor (including not employing or using children as labor and equal pay for equal work), health, safety, welfare, sanitation and working conditions. The Concessionaire shall base the employment relationship upon equal opportunity and fair treatment, and shall not discriminate with respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment or retirement, and discipline. The Concessionaire shall provide equal wages and benefits to men and women for the work of equal value or type.

Working Hours: -

The workers shall not be made to work outside the normal working hours stated in the employment terms & condition (appointment letter), unless: Otherwise stated;
The Independent Engineer gives consent, or The work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Concessionaire shall immediately inform IE and seek consent.

Facilities for Staff and Labor: -

The Concessionaire shall provide welfare facilities for the Personnel. The Concessionaire shall not permit any of the Concessionaire Personnel to maintain any temporary or permanent living quarters within the ISWM Facility.

Medical and Accidental Facilities: -

The Concessionaire shall at all times take all reasonable precautions to maintain the health and safety of the employed personnel. In collaboration with local health authorities, the Concessionaire shall ensure

that medical staff, first aid facilities, sick bay and ambulance service are available at the ISWM Facility. The Concessionaire shall appoint a Safety Officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the contract period, the Concessionaire shall provide whatever is required by this person to exercise this responsibility and authority. The Concessionaire shall send, to IE, details of any accident as soon as practicable after its occurrence. The Concessionaire shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as IE may reasonably require. If malaria or other insect-borne diseases be prevalent in the ISWM Facility, the Concessionaire shall provide his staff and labor with suitable prophylactics, equip living accommodation with screens and bed-nets, and carry out spraying with approved insecticides, as appropriate and to the IE's satisfaction. The Concessionaire shall be responsible for the safety of the labor employed by him and he shall be liable for payment of necessary compensation in the case of accidents as per Workers Compensation Act.

When excavations have been made or obstacles have been put in public through-fares or in places where there is likelihood of accidents, the Concessionaire shall comply with any requirement of law on the subject and shall provide suitable Hoarding- Lighting, watchmen when and where necessary or by any duly constituted authority, for protection of works and safety and convenience of the public or others. In case of excavations on roads, a traffic diversion plan should be made and got approved by the concerned authorities. It shall be the Concessionaire's sole responsibility to protect the public and its employees against the accident from any cause and he shall indemnify the Government against any claims for damages for injury to person or property, resulting from any such accidents and the Concessionaire shall, where the provisions of the Workmen's Compensation Act apply, take steps to properly insure against any claims thereafter.

When an accident occurs at any municipal solid waste collection, segregation, storage, processing, treatment and disposal facility or landfill site or during the transportation of such waste, which results in the death of any of the workmen employed by the Concessionaire which is so serious as to be likely to result in the death of any such workmen, the Concessionaire shall within 24 hours of the happening of such accidents, intimate the Authority in writing, the fact of such accident. The Concessionaire shall indemnify Authority against all loss or damage sustained by the Authority resulting directly or indirectly from Concessionaire's failure to give intimation in the manner aforesaid including the penalties or fines if any payable by the Government or Authority as a consequence of authority's failure to give notice under the Workmen's Compensation Act or otherwise confirm to said Act in regard to such accident. In the event of an accident in respect of which compensation may payable under the Workmen's Compensation Act VIII of 1923 whether by the Concessionaire by the Government as principal it shall be lawful for the Competent Authority to retain out of moneys due and payable to the Concessionaire such sum or sums of money as may, the opinion of the Competent Authority shall be final in regard or all matters arising under this clause.

The Concessionaire shall provide and maintain upon the Works and the Site sufficient, proper and efficient life-saving appliances and first-aid equipment to the approval of the IE and in accordance with the requirements of ILO Convention No.62. The appliances and equipment shall be available for use at all times during the Contract Period.

HIV-AIDS Prevention: -

The Concessionaire shall conduct an HIV-AIDS awareness program via an approved service provider, and shall undertake such other measures as are specified in this Contract to reduce the risk of the transfer of the HIV virus between and among the Contractor's Personnel and the local community, to promote early diagnosis and to assist affected individuals.

The Concessionaire shall: -

i. conduct Information, Education and Consultation Communication (IEC) campaigns, at least every alternate month, addressed to all the Site staff and labor (including all the Contractor's employees, all Sub- Contractors, and all truck drivers and crew making deliveries to Site for construction activities) and to the immediate local communities, concerning the risks, dangers and impact, and

appropriate avoidance behavior with respect to Sexually Transmitted Diseases (STD)— or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular.

ii. Provide male or female condoms for all Site staff and labor as appropriate.

iii. Provide for STI and HIV/AIDS screening, diagnosis, counseling and referral to a dedicated national STI and HIV/AIDS program to all Site staff and labour.

Supply of Drinking Water and Sanitation: -

The Concessionaire shall so far be reasonable, having regard to local conditions, provide on the Site and at his expense an adequate supply of drinking water for the use of Contractor's staff and work people, together with sanitary facilities (portable toilets or latrines), to the satisfaction of the IE.

Measures against Insect and Pest Nuisance: -

The Concessionaire shall at all times take the necessary precautions to protect the Concessionaire's Personnel employed on the Site from insect and pest nuisance, and to reduce their danger to health. The Concessionaire shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.

Alcoholic Liquor or Drugs: -

The Concessionaire shall not, otherwise than in accordance with the Laws of the Country, import, sell, give barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift barter or disposal thereto by Contractor's Personnel.

Festivals and Religious Customs: -

The Concessionaire shall respect the Country's recognized festivals, days of rest and religious or other customs.

Funeral Arrangements: -

The Concessionaire shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of his local employees who may die while engaged upon the Works.

Prohibition of Forced or Compulsory Labor: -

The Concessionaire shall not employ "forced or compulsory labor" in any form. "Forced or compulsory labor" consists of all work or service, not voluntarily performed, that is extracted from an individual under threat of force or penalty.

Prohibition of Harmful Child Labor: -

The Concessionaire shall not employ any child to perform any work that is economically exploitative, or is likely to be hazardous to, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.

The Concessionaire shall not employ any child to perform any work, including work that is economically exploitative, or is likely to be hazardous to, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, moral, or social development. "Child" means a child below the statutory minimum age specified under applicable National, provincial or local law.

Employment Records of Workers: -

The Concessionaire shall keep complete and accurate records of the employment of labor at the Site. The records shall include the names, ages, genders, hours worked and wages paid to all workers.

These records shall be summarized on a monthly basis and shall be available for inspection by the

Engineer during normal working hours.

Workers Organizations: -

Concessionaire shall enable alternative means for the Concessionaire's Personnel to express their grievances and protect their rights regarding working conditions and terms of employment.

Concessionaire shall not discourage the Concessionaire's Personnel from forming or joining workers' organisations of their choosing or from bargaining collectively, and shall not discriminate or retaliate against the Concessionaire's Personnel who participate, or seek to participate, in such organisations and bargain collectively. The Concessionaire shall engage with such workers' representatives.
Workers' organisations are expected to fairly represent the workers in the workforce.

Non-Discrimination and Equal Opportunity: -

The Concessionaire shall not make employment decisions on the basis of personal characteristics unrelated to inherent job requirements. The Concessionaire shall base the employment relationship on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, promotion, termination of employment or retirement, and discipline. Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination.

Insurance for Contractor's Personnel: -

The Concessionaire shall effect and maintain insurance against liability for claims, damages, losses and expenses (including legal fees and expenses) arising from injury, sickness, disease or death of any person employed by the Concessionaire or any other of the Contractor's Personnel. The insurance shall cover the Employer and the Engineer against liability for claims, damages, losses and expenses (including legal fees and expenses) arising from injury, Sickness, disease or death of any person employed by the Concessionaire or any other of the Contractor's Personnel, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the Employer or of the Employer's Personnel. The insurance shall be maintained in full force and effect during the whole time that these personnel are assisting in the execution of the Works. For a Subcontractor's employees, the insurance may be affected by the Subcontractor, but the Concessionaire shall be responsible for compliance with this Clause.

In addition to any other insurance required to be taken out by statutory requirements (e.g. Workmen's Compensation Act 1923), the Concessionaire shall take out an Accident Insurance in favour of each workman employed by him on the Works. Provided that, in respect of any persons employed by any Sub-Contractor, the Concessionaire's obligations to insure as aforesaid under this Sub- Clause shall be satisfied if the Sub-Concessionaire shall have taken out Accident Insurance in respect of Concessionaire's workmen employed on the works and the Concessionaire shall require such Sub-Concessionaire to produce to the Employer, when required, such policy of Accident Insurance and the receipt for the payment of the current premium.

Disposal of excavated earth/rock during construction: -

During the site clearance and disposal of debris, the Concessionaire will take full care to ensure that public or private properties are not damaged /affected and that the traffic is not interrupted.

The Concessionaire will dispose of debris only to the identified places or with prior permission of the Independent Engineer. The Concessionaire will also dispose of the debris for the improvements for public utilities after the proper consent of villagers/community and approval of the Engineer.

In the event of any spoil or debris from the sites being deposited on any adjacent land, the Concessionaire

will immediately remove all such spoil debris and restore the affected area to its original state to the satisfaction of the Engineer. The Concessionaire will utilize effective water sprays during the delivery and handling of materials when dust is likely to be created and to dampen stored materials during dry and windy weather. Materials having the potential to produce dust will not be loaded to a level higher than the side and tail boards and will be covered with a tarpaulin in good condition.

During earth removal and disposal of debris proper warning signs will be installed to the satisfaction of the IE. Any diversion required for traffic during disposal of debris shall be provided with traffic control signals and barriers after the discussion with local people and permission of the concerned officer. During the debris disposal, Concessionaire will take care of surrounding features and avoid any damage to it. The disposal of debris will not impact any endangered/rare flora and fauna. The horticultural and debris shall be separately collected and disposed of in accordance with the Bye laws and not to be mixed with municipal solid waste.

SANITATION AND HOUSEKEEPING AT THE LABOUR /CONSTRUCTION CAMPS:-

For laborers from outside or migrant labour, engaged by the Concessionaire for construction of ISWM Facility, temporary camping arrangements shall be made by the Concessionaire including basic daily facilities. The Concessionaire shall ensure the social safety, security and health condition of labour including women and children (if any). The number of temporary camps/tents and related facilities would depend upon the number of laborers engaged during construction period.

Site Selection: -

The construction labour camps shall be located at least 200-500m away from habitations at identified sites. The living accommodation and ancillary facilities for labour will be erected and maintained to standards and scales approved by the engineer. The camps must be located such that the drainage from and through the camps will not endanger any domestic or public water supply. All sites must be graded, ditched and rendered free from depressions such that water may get stagnant and become a nuisance.

Water Supply: -

An adequate and convenient water supply, approved by the appropriate health authority, must be provided in each camp for drinking, cooking, bathing and laundry purposes.
At all construction camps and other workplaces, good and sufficient water supply will be maintained to eliminate chances of waterborne /water-related/water-based diseases to ensure the health and hygiene of the workers.

Toilet Facilities and Hygiene: -

The Concessionaire shall have an adequate supply of water, close to latrines and urinals.

Within the precincts of every workplace, latrines and urinals will be provided in an accessible place, and the accommodation, separately for each of these, as per standards set by the Building and other Construction Workers (regulation of Employment and Conditions of Service) Act, 1996. Except in workplaces provided with water-flushed latrines connected with dry earth system (receptacles) which will be cleaned daily during working hours and kept in a strict sanitary condition. Toilet facilities adequate for the capacity of the camp must be provided. Each toilet room must be located so as to be accessible, without any individual passing through any sleeping room.
Where the toilet rooms are shared, such as in multifamily shelters and in barracks type facilities; separate toilet room must be provided for each sex. These be distinctly marked “for men” and “for women” or marked with easily understood pictures or symbols.

Disposal arrangements for the waste generated at construction camp: -

Waste bins must be provided in the camps and regularly emptied and the waste disposed 0ff in a hygienic manner to the satisfaction of relevant norms. Unless otherwise arranged for by the local sanitary authority, arrangement for disposal of excreta by incineration at the workplace will be made by means of as suitable

incinerator approved by the local medical health or municipal authorities.

Alternatively, excreta may be disposed off by putting a layer of night soils at the bottom of a permanent tank prepared for the purpose and covering it with a 15 cm layer of waste or refuse and then covering it with a layer of earth for a fortnight (by then it will turn into manure). On completion of the works, all such temporary structures will be cleared away, all rubbish burnt, excreta tank and other disposal pits or trenches filled in and effectively sealed off and the outline site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the IE.

Note: The concessionaire may follow the guidelines issued by National Institute of Urban Affairs for the subject work related ISWM project for all its norms and guidance's.

SCHEDULE 27 - TERMS OF REFERENCE FOR UNDERTAKING COMMUNITY PARTICIPATION PROGRAM

1. INTRODUCTION: -

This Schedule shall be referred to as a guidance note for developing the awareness amongst the citizens of the project area about the need of keeping their city clean by following MSW Rules and cooperating with the Concessionaire in achieving the objectives of the Project.

The community participation is important to:

- Achieve the principles of reducing, reusing, and recycling waste.
- Discouraging littering of waste on streets and into drains, open spaces, water bodies,
- Promotes storage of waste at source, segregated as biodegradable and non- bio-degradable (so that hazardous waste and infected waste are kept separate).
- Achieve increased level of awareness about the efficient methods of waste management among the public through involvement of RWAs, or NGOs.

2. Agency for Carrying out IEC activity: -

The concessionaire shall carry out the IEC activity or alternatively may hire appropriate agencies having proven credentials in IEC activity. The hired agency by the concessionaire may be an NGO, Society or Body Corporate.
In case the concessionaire hires agency other than itself then that agency must possess at least following credentials in activities:

a) Design and Implementation of household surveys, assessment and reporting

b) Community awareness building for behavior change and Information Education Communication (IEC) Programs related to solid waste management, sanitation, health and hygiene, economic and social well-being of rag pickers, sanitary workers, vulnerable groups etc. livelihood, composting etc.

c) Capacity Building of local groups on livelihood, social safeguard, sanitation, health and environment impact due to improper disposal and handling of solid waste.

d) The agency shall impart project specific training to them prior to deployment. Whenever services of NGO staff are found /noticed unsatisfactory by AUTHORITY they shall be removed/terminated by the concessionaire immediately as per direction of Competent Authority.

3. Program Objectives: -

4.1 Awareness Generation: -

The following objective would be attained through production of IEC materials and its usages at different level:

a) Create awareness among the community, and prepare residents for upcoming project, inform about MSW rule, source segregation, health and environment impacts, roles of AUTHORITY's and Concessionaire in the Project, etc. through web site, mass media

communication strategies such as newspapers releases, hoardings, glow sign boards, radio, TV, street plays, etc.

b) Design IECs best suitable to reinforce the messages given by agencies involved in implementation of PPP SWM in towns or other local initiatives at AUTHORITY level

4.2 Social Safeguard of Sanitary Workers: -

- Training of sanitary workers for improved health and economic status of sanitary workers through regular use of personal protective equipment (PPE)/ protective gears.

4.3 Income Generation through Waste: -

- Training and handholding of rag pickers and kabari merchants to be active members of private operators for Secondary collection of segregated waste and its disposal at identified locations.

Target Groups:

The Concessionaire is expected to network, coordinate and consult with the following target groups and beneficiaries:

- AUTHORITY's for promoting town level Program and support consultations)
- AUTHORITY officials
- Mayor/Chairman
- All ward councillors in Program towns/Board members of Urban Local Bodies
- Education Department
- Health Department
- Pollution Control Department
- Officials of leading newspapers within town
- Senior citizen forum, clubs, local samities, or any other influential groups
- Colleges, and institutes, National Social Service (NSS), National Cadet Corps (NCC), Scouts and Guide, Eco-clubs in schools, etc.
- Men, women, and children in wards including poverty pockets
- Local samities or groups (newly formed within the Program or existing)
- School Principals, Teachers, and Children in wards
- Vyapar Mandal
- Hotel Association
- Dharamshala Association
- Identified Rag pickers as per census conducted within program
- Formal and informal waste traders
- Maid servants (male and female)
- Sanitary workers, security persons placed at sanitary land filled sites, sanitary workers engaged in drain and septic tank cleaning and other related persons
- Any others, as per need and requirements

4. Suggested Approach: -

The Concessionaire can facilitate discussions amongst residents and local groups through brochures, pamphlets, and any other appropriate methods to disseminate identified information to individuals.

The following are some of the proposed approach and methodologies for awareness generation but not limited to. The Concessionaire is expected to explore the suggested

approach best suitable to local needs and requirements. Other local innovations and related initiatives if any will be appreciated.

5.1 Baseline Survey/data collection: -

Conduct baseline survey to assess the socio-economic status of target groups, willingness and affordability of resident to pay, census of rag pickers, and formal and informal traders involved in collection of plastic and other waste. This baseline information would help the AUTHORITY's to decide the user's fees as per economic status and category of users such as shops, hotels, dharamshalas, temples, vegetable mandi, marriage halls/gardens, hotels/restaurants, etc.

5.2 Stakeholders Analysis: -

a) Any intervention will affect stakeholders differently; some of the stakeholders can influence the decision-making process. It is important therefore to identify stakeholders who might have a negative impact (such as informal rag pickers) and those who can influence the decision-making process (such as business owners and neighbours of site of ISWM Facility).Concessionaire need to consider the proposed list of stakeholders and related categories for doing the stakeholder analysis.
b) Concessionaire shall assess who are the different stakeholders in the project; does the project threaten the interest of certain stakeholders; what potential conflicts among the stakeholders can the project create etc. These would help to include messages in IEC materials and organise training programs accordingly.

5.3 Stakeholders Consultation: -

a) Organise formal or informal process of consultation with residents in city locations or through door-to-door initiatives. The main objective is to establish meaningful interaction between municipal officers, citizens, and other stakeholders and to obtain consensus on a concrete plan of action. Representative groups should be consulted to ascertain their perceptions of the SWM services, their expectations, willingness to support and participate in the SWM program and willingness to pay for the services, the mode of payment, and the periodicity of payment.
b) The most effective way to ensure that the right messages reach all participants is to launch a door-to-door awareness campaign. This step is very important. At all stages of the project, it establishes continuing contact with the participants, provides feedback, and builds a bond between the project and the beneficiaries. It kills any space for rumour mongering and builds the confidence of the people, who begin to believe that the project means to deliver the goods.
c) The Concessionaire shall facilitate the initial ward cleaning with support from the AUTHORITY to develop confidence and faith amongst households that some good practices on SWM will start in their area. This can be an entry point activity in the ward for starting a secondary garbage collection system.

d) Religious leaders play a significant role in changing people's minds. Recommendation from a well-respected religious leader to keep surroundings clean, avoid littering, and manage waste as advised by the NGO will go a long way toward improving the situation in urban areas.
e) Coordinate with hotel and market associations, institutions, etc. to ensure garbage collection time best suitable to local needs and active participation in collection of user's fees.

5.4 Community Organization: -

a) Identify Swachta-Samities/RWAs that are taking some initiatives at the local level with limited technical skills and resources. The NGO can reorganise the group, and do the required capacity building and utilise their resources in initiating secondary garbage collection with support from sanitary workers not employed by AUTHORITY or working on contract, rag pickers etc. In the absence of existing groups it is expected to form new such groups. These groups can be named as 'SWACH Bhopal' in each ward/mohalla.
b) The Concessionaire can form clusters within town as per zone boundaries marked by AUTHORITY's. The group formed at the cluster level will be ultimately responsible to ensure secondary garbage collection.

5.5 Awareness activities: -

a) Implement campaigns within government schools especially regarding source segregation, health and environment impact. Organise regular meetings with principals, teachers, and students to explain the need for change and the usefulness to society of new ways to manage waste. The message can be reinforced by holding essay, debate, or drawing and painting competitions on the subject and publicizing the winning contestants. The leading schools could be persuaded to work as role models for other schools in taking up awareness campaigns in the city through their students. Such campaigns should be highly publicized, and other schools should be persuaded to follow suit.
b) Prepare hoardings/glow sign boards and do wall writing at prominent locations on source segregation and health and environment impact. In addition, other mass media communication strategies can be used for community awareness on identified topics at large such as, TV and radio audio and visual spots.
c) Organise regular street plays for awareness about waste management and motivate non-participating residents. The main objectives of this tool of communication will be to
    - Attract residents to participate in the on-going SWM program
    - Emphasize the importance of segregation and disposal of household garbage in keeping streets clean
    - Drive home the importance of garbage reduction and waste recycling and discourage use of plastics in daily life.
    - Disseminate information on the benefits of composting wet waste and kitchen waste.

5.6 Income Generation from Waste Collected: -

Recycle paper and plastic carry-bags; promotes the concepts of waste segregation, waste minimization, and waste recycling; and provides employment opportunities.The following activities can be conducted:

a) Awareness generation amongst stakeholders regarding health hazards of plastic and related livelihood opportunities.

b) Create awareness amongst beneficiary households for source segregation of waste including plastic.

c) Organise workshop amongst school children and women kitty groups/self- help group

d) Train informal rag pickers to become professional waste workers in the private sector.

5.7 Social safeguard of waste collector and sanitary workers: -

a) Ensure capacity building of rag pickers, sanitary workers, vehicle drivers, guards/security

person in-charge stationed at sanitary land filled site for use of protective gear, health and environment impact due to improper handling and disposal of solid waste

b) Promote use of protective gears amongst sanitary workers engaged SWM Service, and aware them about health and economic impact.

c) Monitor and document use of protective gears amongst sanitary workers and rag pickers as per identified PPE (personal protective equipment) safeguard checklist. Plan motivational campaigns for its regular use as per need.

5.8 Role of Women associations in SWM: -

Women are generally found to be more concerned with the maintenance of health and hygiene, and they are involved in domestic waste management on a day-to-day- basis. Awareness among women in small groups could be organised. The literature produced in very simple, understandable language and graphics to create awareness among women are also disseminated

5.9 Capacity building of local groups: -

a) Organising a training program for Green Howrah group, and RWAs to motivate the community toward waste management is important for ensuring the sustainability of training informal rag pickers to become professional waste workers in the private sector.

5.10 Social safeguard of waste collector and sanitary workers: -

a) Ensure capacity building of rag pickers, sanitary workers, vehicle drivers, guards/security person in-charge stationed at sanitary land filled site for use of protective gear, health and environment impact due to improper handling and disposal of solid waste

b) Promote use of protective gears amongst sanitary workers engaged SWM Service, and aware them about health and economic impact.

c) Monitor and document use of protective gears amongst sanitary workers and rag pickers as per identified PPE (personal protective equipment) safeguard checklist. Plan motivational campaigns for its regular use as per need.

5.11 Role of Women associations in SWM: -

Women are generally found to be more concerned with the maintenance of health and hygiene, and they are involved in domestic waste management on a day-to-day- basis. Awareness among women in small groups could be organised. The literature produced in very simple, understandable language and graphics to create awareness among women are also disseminated

5.12 Capacity building of local groups: -

Organising a training program for the Clean Howrah group, and RWAs to motivate the community toward waste management is important for ensuring the sustainability of a system. All stakeholders need to be oriented toward segregation at source and to understand the problems and health issues concerned with inefficient disposal of municipal solid waste.

a) Rag pickers and kabadiwalas (itinerant waste retrievers) should preferably be involved for secondary collection of source-segregated waste. Rag pickers need to be educated on the ill effects of abusing alcohol and drugs, rummaging through garbage piles without safety gear, contracting infections through unsafe handling of waste, and so forth.
b) Training in the right method of segregation and collection of waste should be given. They should also be taught to manage their time and to follow the route plan for each sector. They should be taught soft skills to interact with residents and to promote congenial working relations with their partners.

5. Expected Outcomes: -

The following are the main expected outcomes of awareness programs and capacity building of local groups:

- Door-to-door collection of waste in segregated form for onward processing;
- Increased knowledge of the community at large about the importance of proper disposal of waste and its health, environmental and economic benefits.
- Production of compost from bio-degradable waste and utility items from plastic waste linked to market/other appropriate.
- Increased livelihood opportunities for kabari merchants, rag pickers, and safai karamchari.
- Community participation and developing the habit of paying user charges.
- Compliance of MSW rules.

6. Support to be provided by AUTHORITY's: -

The AUTHORITY's will support the Concessionaire in following issues:

- Support to Concessionaire in coordinating and networking at district level departments and agencies if required regarding follow-up of pending issues, and handling of grievances
- Facilitate in identifying the gaps in implementation of awareness activities at field level
- Monitoring, supervision, and review of Concessionaire's activities on a monthly basis

The AUTHORITY officials should be involved in the whole process since its inception. This will include on job training, regular support, monitoring, and supervision. AUTHORITY involvement will ensure a sense of ownership, which is essential to ensure sustainability of the SWM mechanism.

7. Monitoring and Reporting Requirements Monitoring System: -

The Concessionaire is expected to conduct the internal monitoring of the activities agreed upon to assess their effectiveness in the field. The IE will provide the basic monitoring indicators. In addition to this, regular monitoring of the IEC activities will be done by AUTHORITY through regular field visits as well as monthly and quarterly review meetings at district and town level.

In-charge IEC activities of Concessionaire will review reports and documents submitted and prepare feedback and comments to improve the quality of their submissions. He/She will prepare a quarterly report on performance of Concessionaire functioning with technical support from IE.

8. Reporting System: -

The Concessionaire will implement activities described above in accordance with the approved work plan during the contract period however for the sake of clarity here the IEC activity shall be carried out for the first five years after signing of the contract

The Concessionaire shall maintain daily records of the progress with regard to the works carried out. These will form the basis of periodic reports and returns as may be required by the IE. The reports to be submitted to Municipal Corporation by Concessionaire are as under:

Table-1: Reports and Returns

Sr. No.	**Deliverables**	**Number of copies**	**Duration**	**Topic**
1.	Action plan	2	Two months of contract inception	Schedule of activities-ward wise
2.	Monthly Progress Reports	2	Tenth day of each month	Brief summary of activities taken up, progress achieved, and problems encountered during the preceding month
3.	Quarterly Progress	2	Two weeks after completion of the quarter	Reports which provide detailed assessments of the progress achieved, problems encountered, and results of the programs taken up
4.	Community level Training Reports	2	Within ten days after the completion of each training program	Topics, objectives, brief details of various sessions, copy of presentations, outcome, suggestions, analysis of feedback, participants registration list, and photographs,
5.	Baseline Reports	2	Three months of contract inception	Survey findings, census data
6.	A Final Report	2	One month prior to completion of assignment	Compliance against activities undertaken, main achievements, suggestions, constraints, successful case study

7.	Documents inclusive of IEC materials	Two hard and soft copies	One month prior to completion of assignment	All documents/materials produced during assignment period
8.	Copies of all data sheets used for the collecting information and data	I set	Same as above	All data sheets and documents collected
9.	Directory of SWACHH Bhopal group	2 sets	Same as above	Name of three key functionaries, phone number and address with photo if possible.

Above reports shall be submitted to AUTHORITY after its verification and approval from Concessionaire. The verification of all above reports shall be carried out by concerned in-charge from Private Operator.

Waste Report

a) Report for Processing Plant

Daily Report for other details of the Processing Facility
[This format is subject to change as per the discretion of the Authority]

Date:				
Downtime of weighbridges (hrs):				
	Downtime of MRF(hrs):			
Downtime of Processing Plant module (hrs):		Description of the module:		
Total quantity of MSW received:			100 %	(tonnes)
Quantity of recyclable MSW recovered:			%	(tonnes)
Quantity of biodegradable and combustible MSW:			%	(tonnes)
Quantity of waste landfilled	Inert waste:		%	(tonnes)
	Process remnants:		%	(tonnes)
	Total(b):		%	(tonnes)
Quantity of unprocessed MSW at the Processing Plant				(tonnes)

Quantity of MSW rejected:	(tonnes)	Reasons for the rejection:	
Amount of energy sold to discom			-------- MU

b) Monthly Report

[This format is subject to change as per the discretion of the Authority]

Date from:			Date to:	
Total downtime of weighbridges(no of shifts):				
Total downtime of MRF(no of shifts):				
Downtime of each Processing Plant module (no of shifts):	S. No.	Module Description		Downtime
Total quantity of MSW received:			100 %	(tonnes)
Total quantity of recyclable MSW recovered:			%	(tonnes)
Total quantity of biodegradable and combustible MSW:			%	(tonnes)
Total quantity of waste landfilled	Inert waste:		%	(tonnes)
	Process remnants:		%	(tonnes)
	Total:		%	(tonnes)
Total quantity of unprocessed MSW at the Processing Plant				(tonnes)
Monthly Average quantity of MSW delivered at the Processing Plant				(tonnes)
Total quantity of MSW rejected:	(tonnes)	Reasons for the rejection:		
Note on compliance to applicable standards				

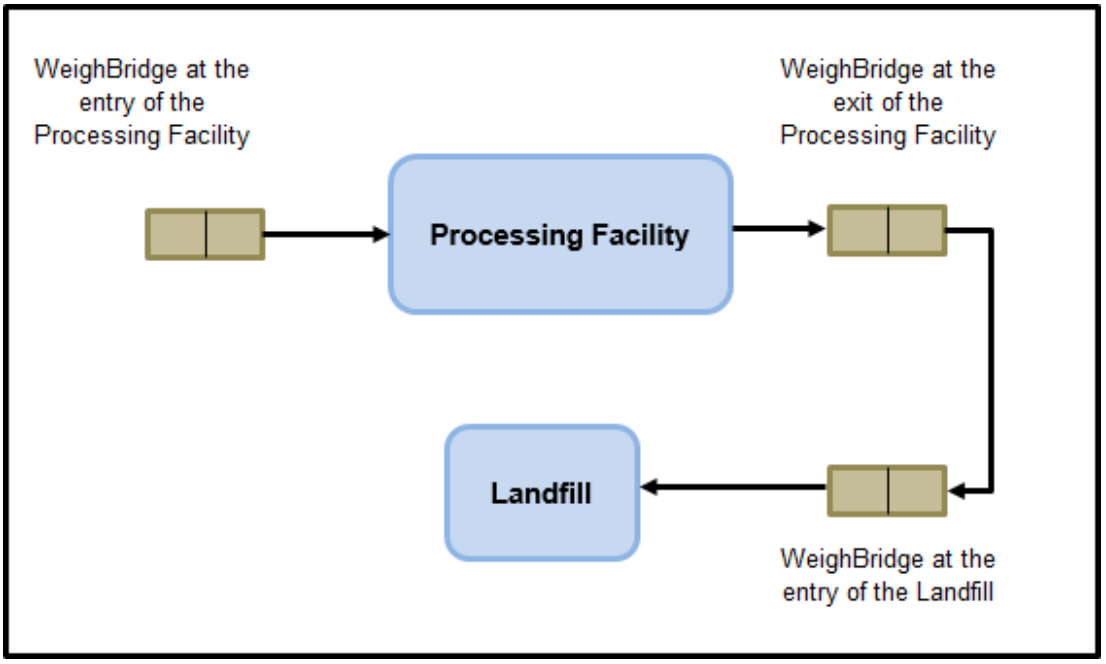
c) Consolidated Monthly Report

[This format is subject to change as per the discretion of the Authority]

Monthly Waste Report	
Date from:	Date to:

Total quantity of MSW received at the Processing Facility	100 %	___(tonnes)
Total quantity of waste landfilled	%	(tonnes)
Total energy sold to the discom		------- MU

d) Schematic Drawing of Weighbridges Locations


WeighBridge at the entry of the Processing Facility
WeighBridge at the exit of the Processing Facility
Processing Facility
Landfill
WeighBridge at the entry of the Landfill

9. Action Plan for Awareness Generation on SWM: -

Above are some of the awareness generation activities which may change according to changing needs of the Program requirements. During the Implementation Period and Concession Period, some new activities can be added as per the identified requirements. The Concessionaire is expected to prepare a detailed action plan for carrying out at least the following activities for awareness generation as a part of the DPR and get it approved by IE and MC for implementation.

Table-2: Proposed Solid Waste Management Action Plan on Awareness Generation

Sl.no	Activity/Issues	Indicators
Output – I Component: Improved and increased solid waste management services through Awareness Generation		
1.1	Baseline survey within the project area	Data on no. of FHH rag pickers, formal/informal traders (FHHs) in the service area for a) socio economic status of community b) access to nearest community bins, c) willingness and affordability to pay by women headed HHs in particular and others in general d) health problems faced by sanitary workers, e) perception about use of protective gears,

		f) status of health benefits
1.2	Public Consultations	With various stakeholders in each lanes of the wards across towns (formal)
1.3	Formation of SWACHH Bhopal	Reorganize the existing local groups if or organize the new groups
1.4	SWM school Campaign	Identify number of secondary government and private schools interested to participate for information dissemination at home and peer group
1.5	Awareness through mass media	Display of hoardings/glow sign boards on source segregation and health and environment impact
		Transmission of awareness messages/audio-visual spots through popular channels, FM on source segregation and health and environment impact
1.6	Street Plays	Street plays on prime hot spots, during local level training, rallies, competitions, public consultations etc.
Output – 2 Component: Secondary Garbage collection, collection of User charges, handling of grievances		
2.1	Secondary garbage collection	Secondary garbage collection by sanitary workers, gradual increase in source segregation & Creation of helpline for grievance handling
Output – 4 Social Safeguard of sanitary workers		
4.1	Use of protective gear during handling of solid waste	Enhanced awareness and active participation
4.2	Health Insurance	Enhanced awareness and active participation
4.3	Financial support to Rag Pickers	Enhanced awareness and increased economic Benefits
Output – 5 Capacity Building of Local Groups		
5.1	Orient sanitary workers on use of PPP and health concerns, good behavior practices, and right method of segregation and collection of waste	Enhanced awareness and increased Health benefits
5.2	Orient Rag pickers on the ill effects of abusing alcohol and drugs, rummaging through garbage piles without safety gear, contracting infections through unsafe handling of waste, etc.	Increased awareness and improved well being
5.3	Orient sanitary workers, and rag pickers on various welfare schemes related to education, health, employment, houses, etc.	Increased awareness and improved well being

SCHEDULE 28 – DELETED

SCHEDULE 29 - PERFORMANCE STANDARDS

[As per Article 19 of the Concession Agreement]

SCHEDULE 30 – LIST OF CLEARANCES
List of Clearances

The Concessionaire should align project development to the relevant clauses / requirements from the following standards / references on environmental regulation and safeguards:

1. Municipal Solid Waste (Management and Handling) Rules, 2000/2016
2. Draft Solid Waste (Management and Handling) Rules, 2013
3. Requirements of the Karnataka State Pollution Control Board (GOK).
4. Other applicable environmental regulation at the National, State and Local Level Following
5. International Finance Corporation (IFC) Performance Standards, 2012 (as required by DFID Environmental Policy and Safeguards) :-
6. Performance Standard 1: Assessment and Management of Environmental Risks and
7. Impacts Performance Standard 3: Resource Efficiency and Pollution Prevention
8. Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
9. Performance Standard 8: Cultural Heritage
10. IFC general EHS Guidelines and MSW Sector Guidelines

The Concessionaire shall comply with the management standards such as ISO 14001 or OHSAS 18001 to better address the environmental and health & safety safeguards and compliance.

As per the national environmental regulation applicable in India, the Table 1 below specifies the key statutory requirements ensuring compliance at the Project area.

Sl. No.	**Regulatory Requirement**
1.	Seeking Authorization from GOK under applicable MSW (M&H) Rules
2.	Develop ToR and seek approval from SEIAA/ applicable approving authority, Appointment of Consultant, Conduct EIA and ensure Environmental Clearance from SEIAA/ applicable approving authority
3.	Seek the consent to Establish and Operate under the Air and Water Acts, and subsequent renewals from GOK
4.	Implementation of the requirements as per applicable MSW Rules during the Implementation and Concession Period
5.	Post EC, conduct project monitoring as per EMP and submit Monitoring Report to GOK / UDD/BSWML.....
6.	Annual Report to GOK/UDD/BSWML

Any statutory requirement as per the Applicable Laws, apart from those mentioned above, and as decided by the Authority and the Independent Engineer during the Planning Phase and during concession period shall also be applicable if any such SWM rules are amended or come into force as per the statutory requirement of GOI.

SCHEDULE 31 - SCHEDULE OF MOVABLE ASSETS

The assets and facilities related to Solid Waste Management in all AUTHORITY's of the cluster and which are in proper condition and can be used or required by the concessionaire, shall be transferred to the concessionaire on as is basis.

If there is a disagreement between Authority and Concessionaire about the condition of the assets and facilities, then (independent Engineer (IE) shall decide about it after properly examining the assets and facilities.

SCHEDULE-I: LIST OF MOVABLE ASSETS

Items	**Quantity**
Trucks	
Poclain Machine	
Refuse Compactor	
Tipper	
Dumper Placer	
JCB Robot	
Tractor Trolley	
Loader	
Auto Rickshaw	
Dumper	

SCHEDULE 32 - DELETED
TIPPING FEE ADJUSTMENT: NOT APPLICABLE

SCHEDULE 33 - DELETED

INTER AUTHORITY ESCROW ACCOUNT AGREEMENT

[DELETED]

SCHEDULE 34- DELETED
DISBURSEMENT GRANT SCHEDULE: NOT APPLICABLE

SCHEDULE 35 - DELETED

SCHEDULE 36 - DELETED
LETTER OF COMFORT

SCHEDULE 37 - LAND LEASE AGREEMENT

[**Deleted]**